COAL AGE

McGRAW-HILL COMPANY, INC.
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Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

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"Mud Slinging" That's Worth While

SOME OF OUR good friends who do not believe in "mudizing" are disturbed lest *Coal Age* advocate this "silly slopping around of dirty water" in mines. They shouldn't become so exercised until the coal industry learns more about this Rocky Mountain development in mine protection against coal-dust dangers. We are not prepared to say that "mudizing" is the thing, and neither is anyone else, not excepting even the developers of the process. However, no mining man who sees the results goes away condemning it.

We are willing, at least, to say that it is advantageous that so much attention has been centered on the rock-dusting problem that this new scheme was conceived. That, in itself is a wholesome symptom for coal mining. As to "mudizing," there is no denying that it has virtues. The thin mud mixture fills crevices and rounds off tiny ledges, thus positively reducing the opportunity for coal dust to collect. That alone is enough to make it a valuable practice, especially in dry mines. Perhaps "mudizing" will form so effective a base upon which to build a dry dusting system, that it will win its way into every well protected mine. At any rate exhaustive experiments with mud should certainly proceed. The coal industry should quickly learn all there is to know about this practice.

One More Laugh

MR. PIN CUSHION, the gifted editor and publisher of the weekly *Squirt*, issued as second-class matter at Washington, D. C., under the pure food and drugs act of June 30, 1908, is all worked up again. The Canadian Government is about to take 20,000,000 tons of coal business in the eastern provinces away from American producers and give it to the Canadian mines by guaranteeing to just about pay the freight on the coal if the mines can't sell it any other way.

Would you believe it? Pin can prove that this is all Mr. Hoover's fault. Mr. Hoover's Department of Commerce which, Pin grieves to say, will receive $3,400,000 this year with which to pay its useless expenses, has "been foster father to the very regulatory proposals which frightened Canada out of our markets," so Pin says. Therefore Canada fears it cannot depend upon the United States for a regular supply any longer. So it will depend, rather, upon its own Maritime Province mines. Just how a subsidy of five mills per ton—or "just about enough to pay the freight"—is going to keep those wild-eyed miners in eastern Canada on the job is too thick for us. But never mind. That's the case anyhow. Pin has spoken and Mr. Hoover is to blame for everything; take Pin's word for it.

What surpasses our mediocre understanding is this: Why has Mr. Cushion been so ready to figure out crimes to charge against Mr. Hoover? All Mr. Hoover ever did was to shut the door of the Department of Commerce to a man who would not be square with ideas Mr. Hoover expressed in interviews. So why all this hectic flush every week? Well there is one good reason. The coal industry likes a laugh as well as anybody.

More Permanency; Less Make-Shift

IT IS A regrettable fact that most electrical and mechanical installations and repairs made inside the mines are carelessly done. Some men often say, "It's good enough for the mines," whenever a job is criticised as being unsatisfactory, or executed in an unworkmanlike manner.

The use of more machinery and larger quantities of electrical apparatus is economically demanded by the mines of today. Each new piece of equipment makes everyone from the miner to the official more dependent upon its successful operation. When a motor, pump, controller or even a signal fails, someone usually must stand by idle. Occasionally the failure of even a small piece of equipment will shut down a whole mine.

Poorly installed apparatus is always a liability; dangers and accidents multiply when machinery that is loose, improperly installed and in disrepair is allowed to be operated. Savings theoretically attainable are often lost because a machine has been incorrectly assembled.

Most companies need to standardize some of their apparatus and to employ men who realize the growing dependence of the entire organization and plant upon the mechanical and electrical equipment installed. The days of makeshifting are about ended.

Now It Can Be Told Best

WE NOTE WITH REGRET the collapse of many sectional plans for "coal institutes" which were going to tackle the job of educating the public about coal. The truth about its production and training in its economic consumption are two classes of facts the public ought to have. As J. C. Brydon said, when he retired from the presidency of the National Coal Association last spring, "The public's interest in coal seems quiescent just now but it might become active at any time." Just so. By the time the next Congress assembles at Washington, a rebellious sentiment in that body might well be active enough to force through destructive coal legislation, unless public sentiment is against such action.

Some contend that it is well to let the public forget the subject entirely and that, therefore, the less said now the better. To us this seems like clinging to public-be-damnedism. The more the people of this country know about coal all the way from face to furnace, the better. If there is anything it should not know, that thing ought to be trimmed out of the industry at once, if not sooner. We believe the truth about this industry can profitably be told and that it ought to be told now above all other times.

In years gone by, every time the industry has made

a concerted effort to tell the public about coal, the economic and political situation was such that coal was in ill repute the country over. Therefore, the lesson in coal was offered just when public acceptance was hardest to win. Why wait until the industry is on the defensive? That isn't good salesmanship. Why reserve all our selling effort for a time when the salesman has to break down the customer's locked door in order to get his all too hostile attention? He can walk in with a smile now, because the price of coal never was lower, considering the cost of production.

"But we can't afford it today," says a big part of the suffering industry. We admit that is a reasonable plea. But which is the better business policy: Spend a little money and effort continuously to prevent the regular and inevitable recurrence of fire, or wait until it roars down upon us and then throw in ten times as much for protection and maybe lose it all?

Coal Claims Credit

COAL has a perfect right to claim credit frankly for aiding materially in the autumn industrial prosperity. And it ought to do so. It always has been easy for the country to blame assorted industrial ills upon high coal prices. Let the country now recognize the fact that, in proportion to the cost of production, coal has never been cheaper than in 1924. There is no better gage of the trend of coal prices than *Coal Age* index which is computed each week from the spot prices of fourteen principal American coals on the main markets of the nation "weighted" with respect to sizes and volume of production. The average coal price this week is $2.12. A year ago this price was $2.25. On Aug. 4, when summer conditions still prevailed, it was $1.98; on April 1 it was $2.09 and on Jan. 1, $2.17. Not since before the war has the country seen such low prices.

A wise and well-known coal operator, talking before the executive heads of a great coal-consuming industry in Chicago last summer, remarked that great industrial advances the world over have been based on low-priced fuel and that the coal operator today recognizes that low-priced coal is necessary henceforth in this country. He said, however, that the operator cannot continue selling his product below the cost of production for that would rot the foundation of all industry.

This man admitted that all too little progress has been made in the past in cost reduction. This he said, has been chargeable largely to labor opposition and discouragingly unprofitable operation of coal mines. What he said is true, but he could have said more. He could have reported that never before has there been so much intense effort devoted to improving mechanical methods in coal mines as in 1924. Industry is bound eventually to profit by it in lower costs. In fact there are already instances where costs per ton have been reduced as much as 25c. Never has there been a year in which union labor has had so severe a lesson in the shortsightedness of its policy of obstructing cost-cutting machinery. Perhaps it may change this policy now.

It is true the coal operator has no big 1924 profits with which to develop cost-cutting machinery and methods; he is being driven to it, instead, by desperate fear of destitution. So, even before union miners' wages are reduced, the industry is working steadily toward lower cost fuel and is thus performing a duty to the nation without "taking it out of labor."

A Union Man Says It at Last

DOWN in western Kentucky is Lonnie Jackson, for years a stalwart labor leader and, until now, president of District 23, United Mine Workers. Nobody ever successfully accused him of being anything short of a loyal fighter for unionism. So unionism has persisted in his own region—Muhlenberg County—while it was collapsing everywhere else in western Kentucky. One reason for this was that coal operators knew Lonnie Jackson to be fair, square and sane. They were willing to deal with such a man. And they are willing now. But unbending adherence to the Jacksonville agreement makes it impossible. Lonnie Jackson says:

"I do not believe in an organization taking the stand that there will be no backward step regardless of circumstances. I believe that facts and figures should be governing factors in fixing wage scales at all times. This is my conception of the trade union movement or collective bargaining. Labor organizations should demand what they are entitled to at a time when conditions are favorable and they should be willing to grant concessions when things are unfavorable and if any district is suffering on account of inequality it should be taken care of through wage negotiations."

Talk such as this is not pleasant in the ears of President John Lewis. It is too true. And it is not pleasant for him to hear Lonnie Jackson say flatly: "Day by day I have seen mines go non-union. I have seen non-union tonnage soar to an alarming extent. I have seen operators, who were always willing to sign contracts with the United Mine Workers, permit their mines to flood because they cannot sign an agreement that will not permit them to compete with non-union tonnage." Jackson knows that "it will be the duty of the officials of our organization as long as they work and receive pay therefor, to oppose what I am saying . . . but I am endeavoring to put before the miners and the public the facts as they appear to me. I am conscientious and I do not fear the result, whatever it may be." And there the case stands.

There isn't much for President Lewis to do or say in reply. He knows this man speaks the truth. But his own hands are tied effectively. He cannot advocate a reduced union wage in western Kentucky, because if he did he would be sacrificing his locals in Illinois and other competing fields—that is, unless he agreed also to a cut in Illinois and the whole domain of unionism. And if he did that right now he would be doing a futile thing. He probably would fail to get the reduced scale accepted and he certainly would succeed in getting himself rushed out of a job. Such is the psychology of the union miner. No "backward step" can be taken until the rank and file demands it, and that may not be until next summer. Till then, at least, conditions must remain *in statu quo*.

For the time being, everybody is right. Lonnie Jackson is right in advocating a cut, just as the Alberta union miners were right this month in accepting a reduction rather than be sacrificed by the international. President Lewis is right because union politics will not permit him to do what he knows should be done. So the confused situation must remain confused—while sections of union territory go non-union or reject headquarters control—until action is initiated by the rank and file. That action is a little closer because such men as Lonnie Jackson have begun telling the union the truth.

Coal Getters

Is the Payroll Dollar Worth the Mine Dollar?

Many Executives Do Not Realize That Wages Are Invested — The Wage Dollar Should Pay Dividends — Human Engineering Is as Indispensible to Success as Mining Engineering

By H. J. Grossman
Cleveland, Ohio

ONE OF THE principal sources of loss to the coal industry is the mistaken idea held by most executives that the "mine dollar" is greater than the "payroll dollar." In other words, a great many executives think that the money invested in their mines and equipment should be more carefully watched than that which is paid out to employees in the form of wages. Either they do not realize that the money spent in this way forms ultimately a far larger investment than that put into mine and equipment, or else they choose to ignore this fact. The result is waste which is passed on to the ultimate consumer in the form of increased mining costs and higher prices.

Not only do most executives fail to realize that investment in payroll—wages—is ultimately a much bigger investment than that in plant and equipment but they also fail to realize that it is fundamentally a more important investment as well. On the average, business cash invested in payroll will exceed cash invested in mine and equipment within two or three years. Even in the largest enterprises the former investment will exceed the latter within five years.

It is impossible to evade the fact that every wasteful practice in the mining of coal is translated into cost. This cost becomes a direct burden on the consumer in the form of higher prices, if a profit is to be made on the output of the mine.

In contributing to this waste and the resultant higher cost of production, some important factors are: the impurities loaded on the cars in the mine and eventually shipped to the consumer, careless handling or rough treatment of tools and equipment, absenteeism and "idle days," restriction of production, opposition to labor-saving devices, uneconomic restrictions, strife and friction, and the like. Much of the waste complained of is due to the attitude of the executives toward their employees and of the employees toward their jobs. Perhaps a larger portion of it may be charged against the attitude of the executives than against the attitude of the employees, for it is upon the former that the latter largely depends. In other words, if executives insist upon giving 95 per cent of their attention to the mechanical side of the business and only 5 per cent to the human side, they have little to complain about if their employees give 5 per cent of their attention to their jobs and 95 per cent to their personal interests. Regardless of what percentage of attention the employees give to their jobs, however, it is obvious that sooner or later any inattention will be reflected in waste.

Co-operation Is the Only Adequate Solution

The question of how wastes and the losses they produce may be lessened in a substantial way, if not prevented entirely, may be answered with a single word —co-operation. The task of obtaining co-operation, however, is by no means simple. Some employers have tried to obtain it by placing industrial spies in their plants to report delinquent employees, who are discharged; but they have failed. Other employers have striven for co-operation, their various activities being classified under the head of welfare work. They have tried to win the co-operation of their employees by giving them something; and they also have failed.

Note—Men, after all, are the greatest assets that a coal company can have. The headpiece shows a group of miners waiting at the shaft bottom to be hoisted to the surface. This is the raw material with which the human engineer in the mining industry has to work.

This naturally brings up the question as to how co-operation really can be obtained. In a negative way it may be answered by saying that it can rarely come from the inside of the organization, because the average executive is unable to analyze the motives that control his employees. To do this properly and effectively it is necessary to approach the matter from an "outside or detached" (not disinterested) viewpoint. The executive himself, being on the inside, the viewpoint is denied him. In a word, it is a case for the trained "man engineer."

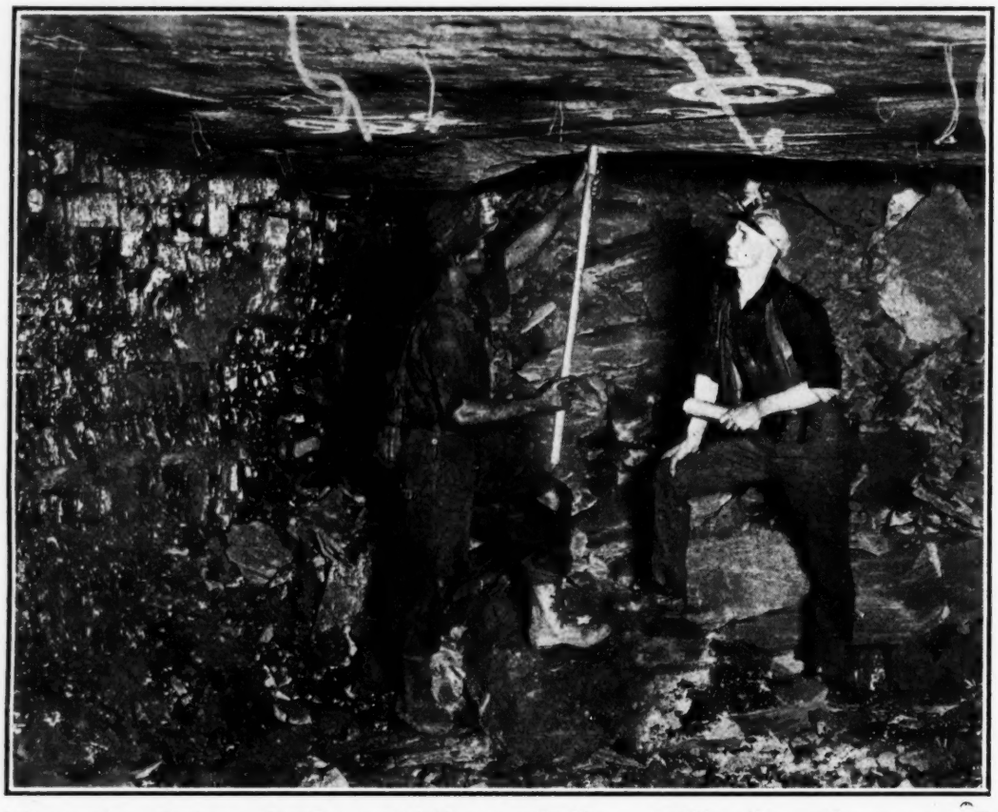
Let us cite a case in point. In it figured a mine equipped with the most efficient machinery, labor-saving devices, plentifully equipped and engineered, yet unable to produce coal at a profit. A survey of conditions in the mine showed an antagonistic attitude on the part of the employees toward the management. This resulted in their opposing the purpose of the equipment and labor-saving devices, thereby restricting production, and causing great losses and wastes. They had been educated by outsiders to believe that these practices were to their interest.

An intense educational effort in the simple economics of the situation, developed a comprehension of the fallacy of their previous methods and practices. This resulted in the economical and cleaner mining of coal, which permitted the operator to offer a price inducement and to extend his area of distribution, thereby providing more stable employment under more agreeable conditions for his workers. The secret was the "outside" or analytical viewpoint and the educational method practically applied. Thus success was achieved through enlisting the co-operation of the employees and their interest in their work to a point where they had a fair understanding of the identity of interest. The executives of this mine had been neglecting its greatest asset—the goodwill and understanding of their workmen.

Unnecessary driving tactics indulged in by those charged with supervision also materially adds to the mining cost through expensive labor turnover and increased antagonism from the workers. This feeling expends itself in opposition to the management's interests. Education of the foremen along similar lines, supplemented by a strongly applied constructive policy will eliminate these losses accruing from the supervision. It is all a case of determining motives and working up the spirit of co-operation through understanding.

Co-ordination Reduces Payroll Loss

The annual payroll loss in some mines is almost unbelievable. In a large operation the payroll was found to be sustaining an annual loss of 25 per cent of the total wage disbursement. By developing a greater degree of co-ordination and constructively molding the employees, as well as the foremen and contractors to the proper appreciation of their responsibility and to an understanding of simple economics, the greater part of this loss has been recovered.



Those Who Actually Produce Coal

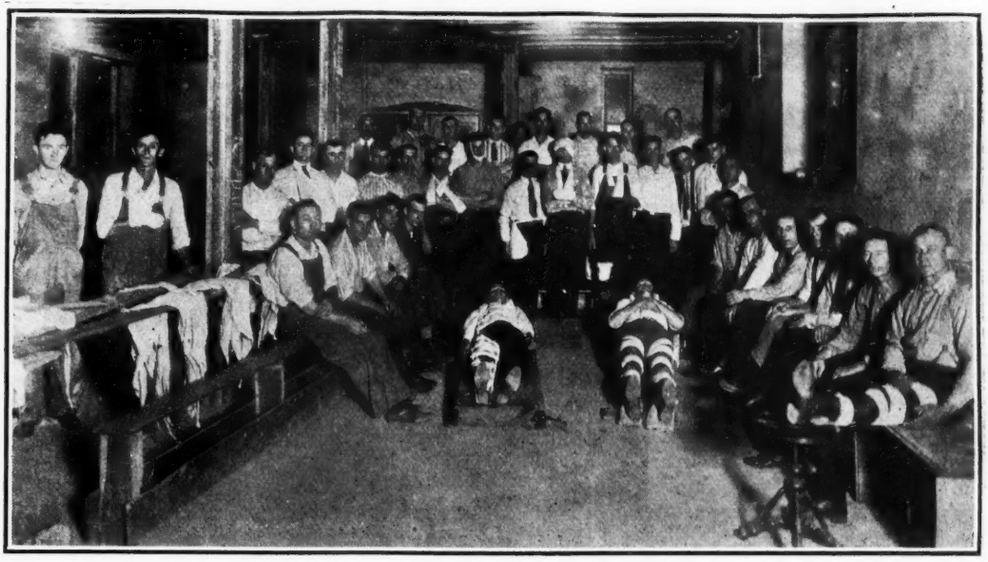
Color makes little difference in loyalty. The important consideration in any industrial enterprise is morale. This may be intangible, incapable of measurement or appraisal, yet it is none the less highly important. The loyalty of even such men as these roof-brushers is well worth securing by the management of any mine.

That the minds of mine workers are not closed to developments of an economic nature is proven by an experience recently had in a non-union operation. Although the mine was operating more or less continuously under a reduced wage scale, the conditions of the coal market plainly indicated a curtailment of output. Realizing that a reduction in price would stimulate sales, and that they would be far better off working for a slight reduction five days a week than one or two days a week at a higher scale, the miners made their views known and graciously accepted the reduction in wage. No doubt when orders are again plentiful they will promptly receive a substantial increase from this constructively inclined operator.

In undertaking the reduction of mining losses, sight must not be lost of that fact that every working force

Common Ground

First aid training in most cases has done far more than teach men how to apply bandages—it has taught them how to meet and appreciate each other. When employee and employer meet in a common cause, differences of opinion are apt to be forgotten. Nothing welds people together more firmly than to work for a common objective or to play on the same team.



is made up of three types of employees—conservative, radical and neutral. Analysis of mines and plants in more than 50 industries has shown that, in a group of 100 typical employees, 10 per cent are conservative, another 10 per cent are radical and the remaining 80 per cent are of neutral motive.

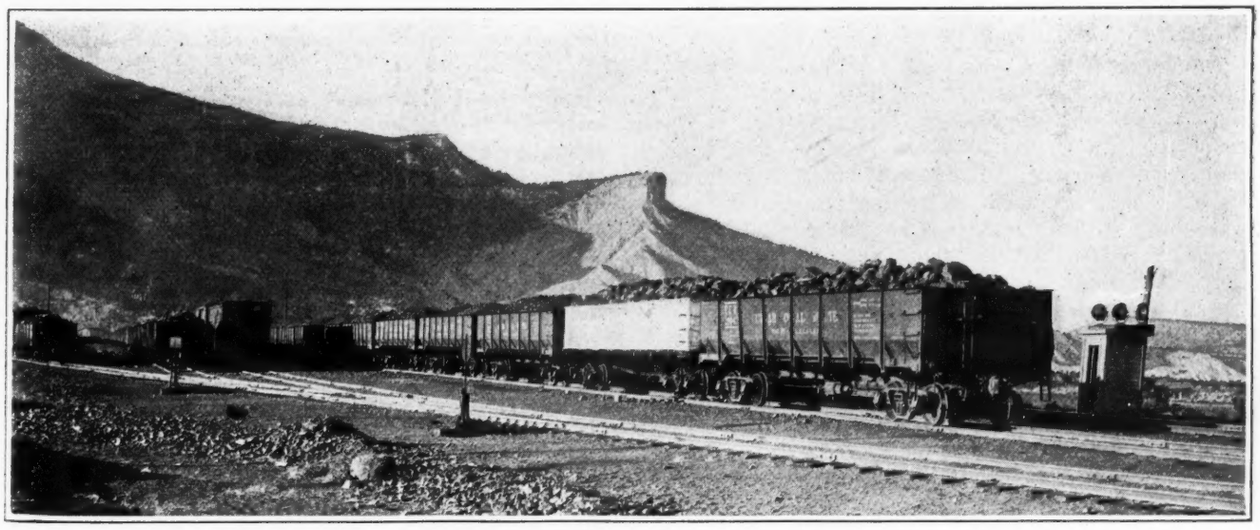
There is no loss on the payroll dollar of the first group, because the employees in it return a full day's work for the wages they receive. The radical-motive group will produce only 50 per cent of a full day's work, with a consequent loss of 50 per cent of the wage investment in them. The 80 employees in the neutral-motive group produce only 75 per cent of a full day's work, and there is a loss of 25 per cent on their payroll dollar. The net result is, in this case, which is typical, a loss in productive value of 25 per cent of payroll investment per hundred employees.

Appreciation of science in machinery and mining engineering is essential in the coal industry but, unless the good-will of the employees can be obtained, no system will earn satisfactory dividends. The co-operation of the mine workers can be had by any employer who will meet them half way. The viewpoint of the employee is the most neglected factor in our modern mining industry. It deserves far greater consideration than it now receives.

A Reliable Crusher Installation

At a certain mine in Illinois a ring crusher was installed about three years ago. This machine is driven by a 50-hp. motor and is used to reduce large coal to stoker size. Since its installation it has crushed a total of 240,000 tons of coal, some pieces being as large as 2 ft. chunks. On the average about 1,100 tons of fuel are passed through this machine each shift.

Thus far no repairs whatever have been necessary on this machine. Expense of operation, including interest, depreciation, etc., amounts to $13.39 per day, which brings the cost of crushing to 1.2 cents per ton. Many coal mines during recent years have installed crushers so as to be able to supply stoker fuel to the trade whenever the demand for this grade is strong. The results obtained in this installation in Illinois show how reliable these crushers can be made.



The Ghost Car of the Rocky Mountain Region

The United States Fuel Co., with headquarters in Salt Lake City, Utah, operates the only white coal car in captivity—and only one. This car, which shines out like Little Eva among the Topsies and the Simon Legrees of coal traffic, is used as an advertising feature for "King" coal. It makes trips here and there among the customers of the company, attracting attention wherever it goes. In this photograph, it stands in the load yard of the Blackhawk mine at Hiawatha, Utah.

How Dangerous Ground Currents Were Prevented And Confidence of Workmen Regained*

Stray Currents Were Eliminated from Shaft and Equipment by Interconnecting Cables—Leads on Firing Caps Should Be Short Circuited Until Used—Damaged Blasting Cables Must Be Replaced at Once

By Emory E. Jones
Electrical Engineer, E. E. White Coal Co., Stotesbury, W. Va.

IN THE LATTER part of 1922 a shaft was sunk on the property of the E. E. White Coal Co., at Stotesbury, W. Va., to the Pocahontas coal beds Nos. 3 and 4. When the shaft had been sunk to a depth of about 65 ft., a premature explosion occurred in the following manner: A sumping shot of eighty sticks of dynamite had been prepared and connections made to an electric blasting circuit of 250 volts direct-current located on the surface. Due to an open circuit in the blasting cable, which ran from the surface to the bottom of the shaft, the charge could not be made to detonate. As two men started to descend the shaft to locate the open circuit, so that the work could proceed, the charge of dynamite exploded. Fortunately, no one was injured, as the shot had been well placed and properly loaded, so that no rock was thrown to the surface.

It was now evident that conditions were extremely dangerous, and the cause of this premature explosion must be found and eliminated. The confidence of the workmen had been shaken and some of them refused to proceed with the work unless steam instead of electricity was used for hoisting and pumping purposes.

Because of the fact that all the equipment was electrically operated and the machinery for sinking had all been installed, it was practically out of the question to use steam. It was therefore evident that the cause of this explosion must be found and remedied.

It was known positively that the circuit leading to this charge of dynamite was open, and that the switch had been disconnected some time previous to the detonation of the charge. It was also believed that the shot had in some way been detonated by what is commonly known as a stray current.

Tests Made to Determine Exact Cause

A number of tests were made to determine the exact cause. In making these tests, first, all the switches were opened, and an ordinary electric blasting cap was connected between the compressed air line and the discharge line from the pumps located at the bottom of the shaft. The instant the connection was made the cap was fired. This showed that a sufficient difference of potential existed between these points to detonate an electric blasting cap. A connection was made between the air line going down the shaft and the ground adjacent thereto. Again the cap was fired, but not instantly, thus showing that there was not at all times sufficient voltage between these points to fire the cap. A connection was made between the electric hoist frame and the ground and the cap was fired instantly. A connection was made between the shaft bottom and a wet place near the surface and the cap was fired in a few seconds.

From these results it was evident that sufficient difference of potential existed between the places selected to fire blasting caps connected in an ordinary circuit in the shaft. To equalize the difference of potential existing at these various places, connections were made with heavy copper wire as follows: The frames of all the machines on the surface, and the pipe lines going down the shaft were electrically connected; holes were dug near the hoist and compressors, and ground connections were made by burying a coil of wire, and bolting the connections to the frames of the machines; salt water was poured on these coils of wire to increase the conductivity, and earth packed over them to fill the holes and insure good contact with the ground.

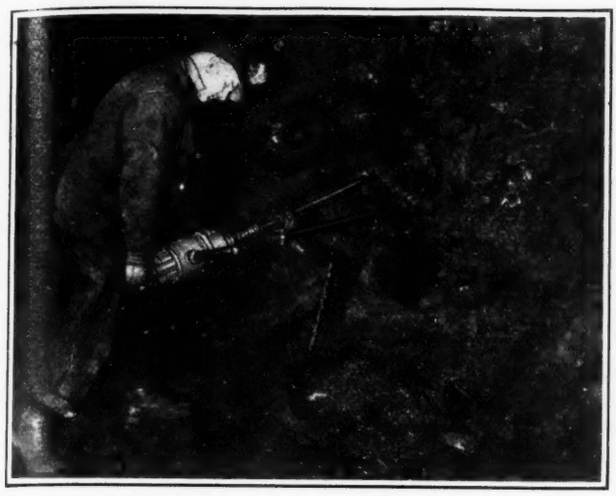
Drilling a Hole by Hand

Whether the hole be drilled in rock or coal makes little difference—damp earthy materials form a conductor that may carry current of sufficient strength to set off a detonator. High-resistance joints in rails, gaskets in pipe lines and a hundred and one other things, not perceptible to the eye, may influence not only the magnitude of stray currents but their path as well.

Tests were then made with a millivoltmeter and no difference of potential greater than 100 millivolts could be detected between any two pipes, between a pipe and ground, or from the top of the shaft to the bottom of the shaft.

After these tests had been completed several blasting caps were given to the workmen, and a prize of $25 in cash offered to anyone who could cause a cap to fire at any place except by the use of the blasting circuit. It was amusing to watch the efforts of the men to fire the caps, and the precautions used in case they should explode. Not being successful in their attempts it was noticed that some of the workmen believed that the caps handed to them were imperfect. They thought these caps to be "phoney." In order to dispel this suspicion each cap was connected to the blasting machine,

*Paper presented before Mining Section of National Safety Council, Louisville, Ky., Oct. 2.



Drilling a Shot Hole Electrically

By what means a hole is drilled makes very little difference so far as stray currents are concerned as the real danger comes between the time of charging and the time of firing. Note, however, the rock band below this shot hole. It may have high resistance while the coal above and below it may have comparatively low resistance. Suppose that in inserting the cartridge and pushing it home one lead wire is scraped bare making contact with the coal and that the bare end of the other wire touches the damp floor. Then suppose that a stray current seeks passage from the coal to the floor. What will happen is obvious.

and fired, thus restoring the workmen's confidence, so that the work could proceed without fear.

The following rules were then posted regarding blasting, and rigid adherence enforced.

Rule 1. Explosives must be placed in an insulated container when being lowered down the shaft.

Rule 2. Not more two men may be in the shaft when shots are being prepared.

Rule 3. The muck bucket must not touch the bottom of the shaft during preparations for a blast.

Rule 4—The blasting machine must remain in the possession of the top man, and may be operated only by the man who prepared the shots, and then only in the presence of the top man.

Rule 5. The whole length of the shooting cable must be inspected daily. If a bare place is found, the cable must be thrown away and a new one secured.

There are obvious reasons for each of these rules. First, if the explosives are in an insulated container while being lowered down the shaft, there is no danger of an electrical contact being made. Second, if only two men are in the shaft during the preparation of the shot, it is certain that not more than two men could be hurt in the event of an accident. Third, if the muck bucket does not touch the bottom, there is no danger of stray currents radiating from it. Fourth, if the blasting machine is in charge of one man, one particular person is responsible for its safe keeping and if the man who prepares the shots is the only one allowed to use the machine, it is evident that no one will connect it until everyone is out of the shaft. Fifth, if a well-insulated blasting cable is used, and it comes in contact with any charged machines or pipe lines, the insulation will prevent leakage of current to the blasting cap.

Since the accident mentioned above some thought has been given the subject, and improvements made in the way of handling electric detonators, especially inside the mines. In the case of the E. E. White Coal Co. the miners are taught to twist the bare ends of the wires of the blasting caps together and keep them in this condition until they are finally connected to the blasting circuit. This simply means that in case the wires of the cap come in contact with a source of current, the ends being short-circuited, there is no danger. Caps are always delivered to the men in paper sacks properly closed at the top so that the ends of the wires can not come in contact with any source of current. The men are taught to suspend blasting cables on wooden posts, and never allow them to come in contact with mine tracks. Blasting batteries are made in such a way that a connection to them cannot be made unless the cable is held in one hand and the battery in the other. Thus there is no danger of a workman leaving his battery connected to a cable and going to the face and attaching another cap. Accidents have happened where miners have left their cables connected to battery terminals and attached blasting caps at the charge.

To those who have studied electrolysis the subject of stray currents is a familiar one. Much study has been given this subject, and some electric railway companies have gone so far as not to use the rails or ground for return circuits at all, in fact, this is the case in Cincinnati. The danger here is not so much the premature explosion of shots but the electrolytic action on steel structures.

If an electric current is passed through a liquid from one metallic plate to another, electrolysis will take place; that is, metal will be deposited on the negative pole, and the positive pole will be dissolved. In an electric railway return circuit there is a difference of potential between parts of the system and the rails and other buried metals, such as pipe lines, steel structures, fire plugs, telephone cables and foundations of buildings. The amount of these differences of potential depends somewhat upon the energy loss in the return circuit, it varies with the amount of current flowing, and the resistance of the return circuit.

It is therefore evident that if pipe lines and buried pieces of metal are all connected together with low-resistance cables, these differences of potential may be practically eliminated. However, it is not so evident that different strata of earth are of relatively low resistance and sometimes separated by a stratum of comparatively high resistance. Nevertheless this accounts

Loading a Hole

When handled properly explosives are harmless: if handled improperly they "let go." The blaster must not only look carefully to the charge of powder itself but also to the detonator and its lead wires. Twisting the bare ends of these wires together forms an electrical connection between them and greatly lessens the danger of premature explosion. This process practically converts the leads from two separate wires into one continuous conductor with no opportunity for current to flow to the cap. Furthermore, joining the wires' ends keeps them together so that they are not likely to touch two points of appreciably different potential.

A Place to Begin to Control Currents

Unbonded or poorly bonded tracks are a continual source of danger and expense. Any current that leaves a generator must return by some circuit or another. If the rail joints present a high resistance the current will pass through the materials offering an easier path.

for differences of potential between earth strata. By the same token, where current is flowing through the earth, there are differences of potential between points on the surface, or between the surface and underground, depending upon the difference in their distances from the source of current the conductivity of the various strata of earth and the amount of current flowing. The first experiments in wireless depended upon this principle. When we consider the small amount of current necessary to fire an electric detonator, and the small amount of voltage required, it is evident that care must be taken not to allow the bare ends of the caps or bare places in the blasting cable to come in contact with conductors, especially pipe lines, steel rails, ponds of water, or wet places of relatively high conductivity due to mineral salts and acids.

It is strongly recommended that all electric blasting-cap wires be twisted together during the process of manufacture, thus minimizing dangers in the field should the wires accidently come in contact with materials having a difference of potential between them.

The cables used for the purpose of electric blasting are usually poorly insulated and cheaply constructed. The insulation consists chiefly of cotton treated with paraffin. A great improvement could be made in this direction which would add to the safety of electric blasting. Manufacturers of electric batteries used for firing electric blasting caps can improve their construction by so arranging the batteries that no permanent connection can be made to them. This refers, of course, to the batteries used by coal miners, where only one cap is fired at a time.

For the benefit of those who wish to calculate the resistance of blasting circuits, I quote literally from J. H. Horlick, Jr., of the Hercules Powder Co., who very kindly furnished this information.

"The actual amount of current required to heat the bridge of our electric blasting cap sufficiently to set off the charge in the cap is approximately 0.4 amp. However, in actual blasting, and with more than one cap connected in the circuit, a greater current is recommended to take care of any slight variation in the bridges of the caps or of any leakage which may occur in the circuit, especially under damp conditions or in metal-bearing materials. For various types of connections we therefore recommend the following currents:

1. For series connection, not less than 1.5 amp.
2. For straight parallel connections, not less than 0.6 amp. per cap in parallel.
3. For parallel-series connections where the caps are in series groups and the groups in parallel, not less than 2.0 amp. per series.
4. For series-parallel connections where the caps are in parallel in groups, and the groups in series, not less than 1.0 amp. per cap in the largest parallel group.

"Of course, it is quite possible to get satisfactory results with less currents than recommended above, especially when a number of caps are placed in the circuit. However, the above minimum currents are recommended so as to have some margin of power to take care of any irregularities in the circuit and provide greater assurance of all caps firing.

"With the necessary current determined, the required voltage then depends upon the resistance of the circuit. In this consideration it is important that the resistance of the entire circuit, and not that of the caps alone, be calculated. For instance, suppose we had a circuit consisting of ten 10-ft. No. 6 copper wire E.B. caps in series with 500 ft. of No. 14 copper wire to the source of power. The resistance of E.B. caps, of course, varies with the length and kind of leg wires, that of Hercules 10-ft. No. 6 copper wire E.B. cap being 1.50 ohms. Ten in series would therefore have a resistance of 15.0 ohms, while the 500-ft. of lead wire would have a resistance of 1.26 ohms. With the minimum recommended current of 1.5 amp. for this series circuit, the required voltage by Ohm's Law would be about 25 volts. For firing only a single cap, a current of only about 0.5 amp. would be sufficient to use in calculating the required voltage along the above lines, in which case about 1.5 volts would probably fire the 10-ft. copper wire cap. It is interesting to note that if a stray current should get through the cap wire insulation near the cap itself, thereby eliminating the leg wire resistance, a voltage as low as about 0.6 volt might fire the cap. However, for more than one cap in regular blasting circuits, we recommend calculations for required power based on more than merely theoretical required current, in order to more thoroughly insure the firing of all caps in the circuit."

Take No Chances With a Damaged Blasting Cable

Bare spots in a cable may touch a mine rail, charged conductor or a pipe carrying current and fire a charge. Inspect the cable every day and replace it with a new one if it is damaged.

Equipment and Safety Methods in Alabama

Auxiliary Fan Drives Assure Reliable Ventilation—Rotary Dumps Discharge Whole Trip at One Operation—Mechanical Samplers Influence Coal Quality—Dust Laid by Washing Down Mine Surfaces

By Milton H. Fies
Vice-President, De Bardeleben Coal Corporation, Birmingham, Ala.

VENTILATING furnaces are still in use generally at drift mines in Alabama where no power is available. This system is costly and inefficient. At practically all mines where power is available various types of fans are used. At some drift operations small fans of about 5,000 cu.ft. per minute capacity are employed; one machine furnishing air for one or two openings. At larger developments, where methane is generated, there are usually two drives to each fan. One of these is generally a motor and the auxiliary drive a steam, gasoline or kerosene engine.

At the No. 1 air shaft of the Woodward Iron Co. a No. 16 Sirocco fan has been installed. This is driven normally by a 150-hp. motor; the auxiliary unit consists of a 100-hp. Fairbanks-Morse kerosene engine. This engine is direct-connected to the fan shaft by a sliding jaw clutch. The motor is connected to the fan by a belt, the pulley being loose on the shaft but provided with jaws cast in the hub to engage a sliding clutch. In case of power failure, it is only necessary to throw out the clutch on the belt pulley, throw in the other clutch and start the engine.

The engine is started with compressed air from a receiver. This is always kept up to pressure by a small compressor that is driven by a 9-hp. gas engine. The entire change can be made in less than 5 minutes. Storage batteries are provided to furnish lights for the attendant at the fan in case of power failure. The layout of this auxiliary drive is shown in Fig. 23.

Both the continuous and split systems of ventilation are in use in the mines of Alabama. In the larger and better-equipped operations, the split system is prevalent. Concrete overcasts and stoppings made of mine rock, faced with a mixture of clay and cement, are found in the better-class mines.

In Some Mines Much Water Must be Handled

It has been found that as pillars are removed, particularly in the Warrior field, the cost of pumping increases greatly. In some of the Pratt mines, where pillars were robbed as the entries were driven to the boundary, from 10 to 15 tons of water have been pumped for each ton of coal produced. It is now the custom, at the larger operations, to extract not over 50 per cent of the coal as the mine advances, leaving large thick pillars. These are robbed as expeditiously as is practicable toward the end of the mine's life. The reduction in pumping by this method will be great.

In the Cahaba field, where all the beds pitch, pumping is a large item of expense, mainly because there are conglomerate and other porous strata above the coal measures. The drainage problem is simplified, however, by the ability to lead the water to a common point.

Methods employed in timbering vary greatly according to the top, and no set principle is followed. The cost of timbering ranges from 1c. per ton to 7 or 8c., depending on the nature of the top and the accessibility of the timber. In recent years, the cost of timber has increased, through the exhaustion of the supply readily available. It is not uncommon at some mines to have the timber shipped in by rail or hauled 10 to 15 miles in trucks.

In the larger, better-equipped mines, slope and main haulage track is laid on sawed creosoted ties with 40 to 60-lb. steel. On cross entries, where mule haulage is used, the rail is 20 lb., but with locomotives it is 30 to 40 lb. Room rails vary from 12 to 20 lb. in weight.

In medium and steeply pitching beds, as a general rule, mules are used on all cross entries for gathering coal to the slopes. Where the pitch is from 0 to 5 deg. locomotives are employed almost entirely for gathering and main-line deliveries. Storage-battery and gasoline machines are used at a few operations and in a few cases endless and tail-rope haulage systems are found.

Belt Conveyor Used as a Slope Hoist

At one mine in Alabama, a belt is used for hoisting coal up a slope. This conveyor operates on a pitch of 19 deg. 53 min. The belt is 4 ft. wide, with troughing idlers on the upper and straight bearing idlers on the lower strand. Head and tail centers are 485 ft. apart and the belt is kept taut by passing over an idler pulley to which a counterweight is attached located just under the head pulley. The coal is discharged in a one-car revolving dump underground. Under this dump is a hopper, which holds about 6 tons, or the capacity of three mine cars. Beneath the hopper is placed a reciprocating feeder which feeds the coal from the hopper to the belt. This feeder is perforated and the slack coal goes to the belt first and the lump coal is deposited on top of it. The belt has a capacity of 2,500 tons per day of 8 hr. A 75-hp. motor drives this conveyor as well as the reciprocating feeder. The advantages of this system are reduced cost of all tipple and head-frame structures, a lower operating expense, a smaller investment in hoisting machines—a 75-hp. motor as against an expensive hoist of 500 to 700-hp. capacity. By regulating the feed at the bottom of the slope coal can be fed to the shaker screen in the tipple with such regularity as to make the screening highly effective, and all danger from slope trips is eliminated.

This belt has been in operation about a year and no wear is noticeable. The mine has not been brought to its full capacity, but 1,100 tons have been handled over this conveyor in one day with the belt standing idle about half of the time.

With beds of such diversified thickness and pitch as here prevail, many types of mine cars are in use in the state. In the more recent developments, cars with-

Note—Fourth and last installment of article entitled, "Alabama Coal-Mining Practices," presented at the Birmingham meeting of the American Institute of Mining and Metallurgical Engineers.

out end gates, and revolving dumps with which to discharge them, are becoming the general practice. At one operation, on a 25 to 35 deg. pitch, Griffith bottom-dump cars are being used with success. One type of tipple installed at a slope mine, and which well illustrates the use of revolving dumps and gateless mine cars, is shown in Fig. 24. This tipple handles about 2,000 tons per 8-hr. day with a counterbalanced haul of five cars per trip. The capacity of the cars is 3,500 lb., making about 9 tons of coal per hoist.

The coal is pulled from the loaded yard up a 30-deg. slope about 1,100 ft. long by an 800-hp. Vulcan hoist. The drums are 10 ft. in diameter with a 4-ft. 6-in. face. The rope speed is 1,800 ft. per minute. A 500-ton reinforced-concrete bin, located over two standard-gage railroad tracks, receives the coal from the gravity dump. The bin is 39 ft. high on the approach end and 49½ ft. high on the hoist end; this gives an angle of about 8½-

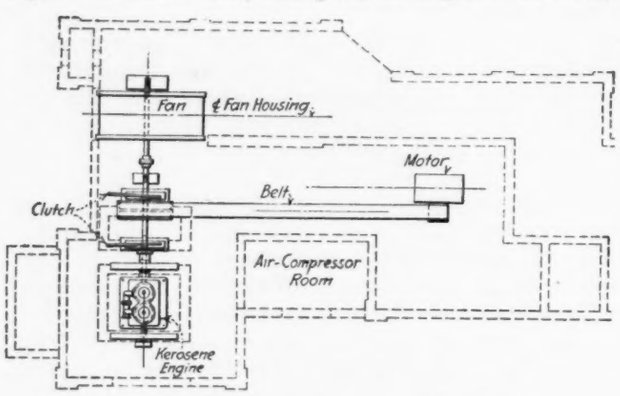


Fig. 23—Auxiliary Drive for a Mine Fan.

When the fan is down the mine is down. This layout shows a fan normally driven by belt from a motor. Should a mishap befall this motor or should the source of power fail a kerosene engine may be started and the fan driven by it. Both engine and belt pully are clutched to the shaft so that shifting drives is a matter of only a few minutes.

deg. in the gravity dump, and facilitates the prompt return of cars by gravity after they have been discharged.

Hoist operation is controlled by electric signals from the man on the tipple, when cars are ready to be returned to the mine, and from the man in the loaded yard, when the trip is ready to be pulled out. The coal is weighed in the underground yard and pulled into the dump which is released by the operator on the tipple. The dump is rotated by the weight of the coal. As the cars empty, the dump returns to its normal position, and latches automatically. It is then ready for the next trip. As the coal leaves the cars in the dump, part of it is caught by sampling chutes in top of the bin.

Every precaution has been taken to make the tipple as fireproof and safe as possible, the main structure being of reinforced concrete and steel. At the top of the tipple, on the hoist end, a 20,000-gal. water-storage tank is provided for fire emergency.

Installation and Advantages of Samplers

All mines in Alabama employ a dockage system whereby miners are penalized for loading excessive quantities of slate or rock. The method generally used to check up the miner is to pick a few cars at random, unload them carefully, a shovelful at a time, and inspect closely the entire contents of each car. The weak point in this method is that only a few cars can be inspected during one day's operation and the miner, knowing this, will take the chance of not being discovered.

Erskine Ramsay, first vice-president and chief engineer of the Pratt Consolidated Coal Co., has perfected a mechanical sampler that has made possible the testing and inspection of a large number of mine cars without actually unloading their contents by hand. The Ramsay sampler has been used more extensively by the Woodward Iron Co. than by any other concern in this district. This company installed its first sampler in May, 1920, at Dolomite No. 1 mine. Since then, two additional machines have been installed at this operation, three have been installed at Dolomite No. 3, and four at the Mulga mine; this gives the Woodward company a total of ten samplers.

At Dolomite No. 1, the coal is hoisted in four-car trips and is dumped four cars at a time by means of two Ramsay, rotary, multiple, slope dumps installed in parallel. Messrs. Crockard and Best, of the Woodward company, made such changes in the usual design of these dumps (which are generally power driven) as to make them rotate by gravity. Installed under these rotary dumps are chutes having hoppers at the top. Beneath the right-hand dump there are two of these chutes by means of which the coal is directed to a sampler room, in which one sampler is installed. Beneath the left-hand rotary dump, there are four chutes leading to a sampler room on that side of the tipple, in which are installed two samplers, each being served by two chutes. The chutes have a hopper arrangement at the top for receiving the coal samples and are equipped with rotary gates operated by cables passing over sheaves and extending to a position convenient for the sampler operator. This man is thus enabled to draw the samples one at a time as required for convenient operation (see Fig. 25).

At the sampler, as installed by the Woodward company, the operator releases the sample from the chute onto a double-deck shaking screen 24x42 in. in size. This feeds slowly to a 24x38 in. picking table. The upper of the two shaking screens has 1-in. circular perforations and the bottom screen ½-in. perforations. The lump material that passes over the upper screen is hand picked. That from the lower deck is discharged onto the picking table through a small gate and is likewise picked. The fines passing through the lower screen go directly to the coal car and are not considered in the sampling. The removal of this material, however, facilitates the sampling operation and makes more careful and faster picking possible.

At Dolomite No. 3 mine, practically the same arrangement has been installed. Here the coal is discharged from the mine cars by two Ramsay rotary dumps in trips of five cars each, instead of four cars as at Dolomite No. 1. Chutes of the same design lead from beneath the coal dump to the sampler room in exactly the same manner as has been described and are equipped with gates so that the coal may pass directly to the sampler or, if desired, may be retarded to suit the convenience of the sampler operator.

Carriers Substituted for Sampler Chutes

At Mulga mine, four samplers have been installed. These are arranged in two rows back to back, but staggered so as to allow sufficient space for the attendants. This installation presented unsual difficulties because of the small space available for the equipment. The amount of head-room was so small that it was not pos-

sible to install gravity chutes; therefore, a small motor-driven carrier was designed to transfer samples from the receiving gates to any of the four machines. This carrier is a small bottom-dump car with wheels running between the flanges of parallel 10-in. channels. A tripper is set by the operator at any of the four machines and when the switch is thrown, the car runs down, strikes the tripper and automatically dumps, thence returning to the receiving gate. A single loading point is possible at this mine as cars are hoisted singly and discharged by a one-car rotary dump.

This battery of samplers is the latest installation made by the company and several small improvements have been effected in the design. The shape of the skirt plate along the picking table has been altered and both shaker and table have been lengthened. The width of the machine remains 24 in., but the shaker screen is 48 in., and the picking table is 54 in. long. The method of actually picking the slate is the same at all installations; that is, the lump is first picked as it passes over the upper deck of the shaking screen to the picking table.

At the lower end of the picking table, there are two compartments; that intended for coal is adjacent to and immediately under the apron of the picking table while that for slate is just beyond the coal compartment. The operator lifts the slate by hand from the table and drops it into the farther compartment; in the mean time the coal gradually passes off the picking table into the near, or coal, compartment. After the slate is picked out, the operator hastens the movement of the coal by brushing it into the coal compartment with his hands.

As soon as the lump coal has been picked, the small gate retaining the material on the lower deck of the shaking screen is opened and it passes onto the picking table and is picked, the coal and slate being deposited in their proper compartments. When the sample has been completely picked, the total weight registered on the scale dial is noted. A gate at the bottom of the coal hopper is then opened, allowing the coal to discharge into the car after which the weight of rock is noted. The rock is then discharged, the gates closed, and the weigh hopper is ready for a new sample. To facilitate weighing, dial scales are used with posts 6 ft. high, thus bringing the dial to the level of the operator's eye. These scales are provided with dials 13 in. in diameter which are graduated to read half pounds.

Cost is Moderate but Results are Big

This detailed operation applies to the Dolomite No. 3 mine, where the average sample weighs about 70 lb. and requires approximately 7 minutes to pick. The samples are identified by means of the miner's check number, which is fastened to the bottom of the car and is noted by the tippleman and passed down to the sampling room by means of a speaking tube. The sampler operator keeps a record headed at the top "Coal Sampler Record." At the left, on the next line, is recorded the name of the coal mine and on the right-hand side in the same line is the date. Beneath this, in parallel columns, is the following information: First column, check number; second column, total weight of sample; third column, weight of coal; fourth column, weight of impurities; fifth column, percentage of impurities.

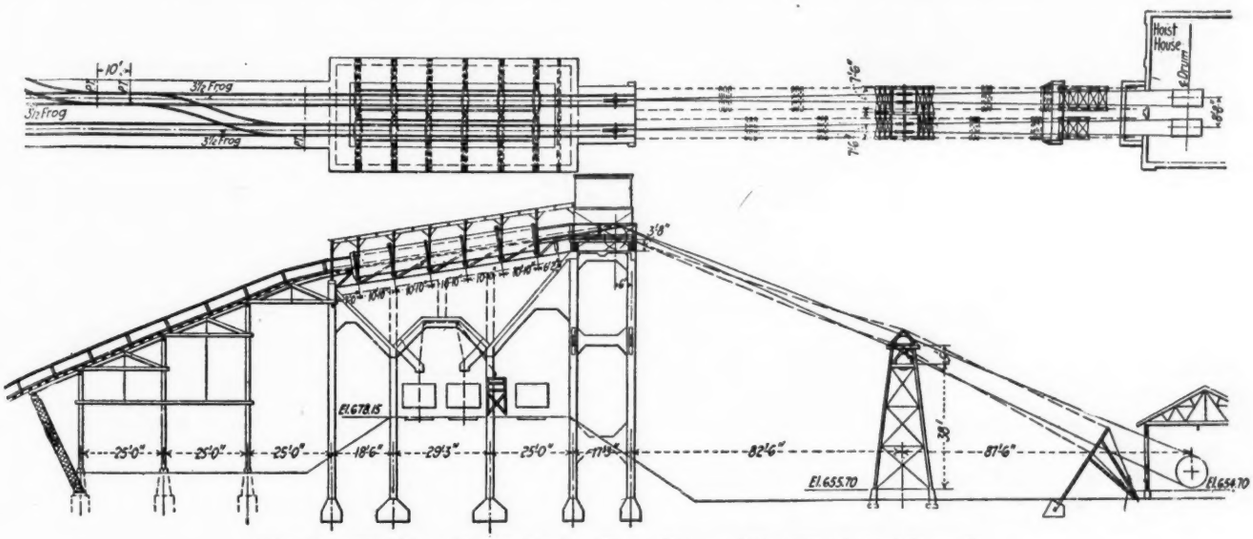


Fig. 24—Tipple at the Dolomite No. 3 Mine of the Woodward Iron Co.

Cars are hauled up the slope in trips of five. In the tipple an entire trip enters and is discharged by a rotary dump set on such a slope that the empty trip will gravitate to the mine. The angle of the dump is 8½ deg. which assures prompt return movement of the empties.

Installation Cost Depends on Tipple Layout

The total cost of installing the sampler depends, of course, on the layout of the tipple and whether or not the coal can be dumped directly into a chute from the sampler or must be transported for some distance. The expense also depends on the cost of supports for the sampler and sampling room, and other considerations of like character which are governed by local conditions. An estimate of the actual cost of one coal sampler complete, built by the Woodward company in its Woodward shops, without considering the cost of chutes, sampler room, sampler supports, etc., was about $300. It requires from 3 to 5½ hp. to operate a sampler.

The scale is supported independently from the sampler, as otherwise the vibration would make close reading impossible. The Woodward company has found that the speed of the eccentric shaft operating the shaker screen should be about 150 r.p.m., also that the throw of the eccentric should be about three inches.

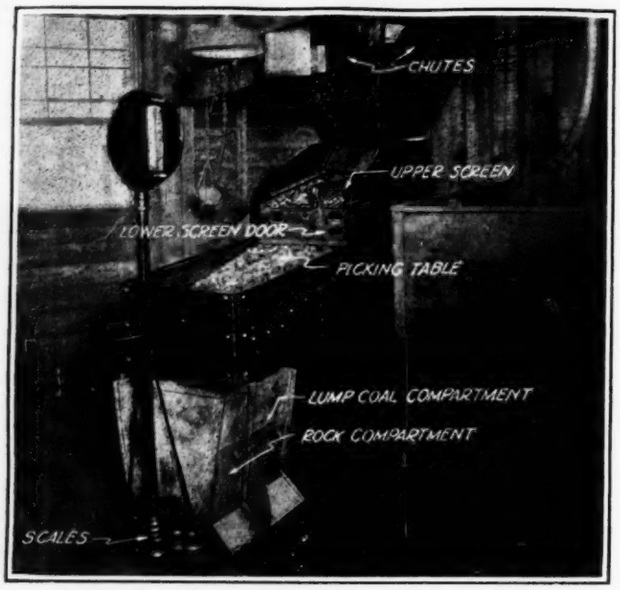


Fig. 25—Ramsay Sampler at Dolomite No. 1

This machine permits quick accurate sampling of the coal contained in a mine car. It has been the means of greatly decreasing the amount of rock and refuse loaded, hoisted and passed through the preparation plants. It tends to keep rock in the gob where it belongs.

Figures furnished by the Woodward company show that the percentage of slate and other impurities in the coal prior to the installation of the first Ramsay sampler, as determined by washer loss, was approximately 20 per cent of the total quantity of material hoisted. Since the samplers have been in operation the percentage of impurities, as determined by the washer losses, has been about 10 per cent. The company believes there is no question but that the reduction, amounting to approximately one half, in the quantity of impurities has been due entirely to the sampler. It is not necessary to give actual figures as to dollars and cents saved. The total amount will be proportional to the total quantity of material hoisted; the company has the 10 per cent direct saving in addition to another highly important economy secured by eliminating the hauling, hoisting, and handling of impurities to the washers. Only one-half as much refuse now comes from the washers and is thrown away as was formerly the case. Not only is the cost of hoisting this material entirely eliminated, but also the wear and tear on the machinery and all of the other incidental items involved in the useless and unnecessary operation of loading rock and impurities when the fundamental aim should be the mining of clean coal.

Progress Made in Mining Coal Safely

Considerable progress is being made toward mining coal safely in Alabama. Progress made in this direction is best visualized by comparing records for a 10-year period, say 1913 to 1923. In 1913, 73.7 per cent of all coal mined in the state was produced by pick and shovel methods and only 26.3 per cent by undercutting with mining machines. During this same year, 68 per cent of the coal was produced with permissible explosives and 32 per cent with black blasting powder. In the year 1923, 53.8 per cent of the state's output was mined by pick and shovel methods, whereas 46.2 per cent of the production was derived from undercutting with mining machines. During the latter year, 78 per cent of the explosives used in coal mines were of the permissible type and only 22 per cent was black blasting powder.

In brief, for the 10-year period, there has been approximately a 20 per cent decrease in pick and shovel mining and a corresponding 20 per cent increase in mining coal with machines. Permissible explosives show an increase of 10 per cent for this period, while black powder showed a decrease of 10 per cent.

Marked improvement has been made in the matter of laying coal dust in the mines of the state. The principal method now used is by the installation of pipe-line watering systems. In most of the large producing mines, efficient watering systems have been installed; while in some of the smaller operations, watering is done in a desultory way by the use of water cars. However, a considerable number of small operations do not use any means of laying coal dust in order to prevent its being raised into clouds with possible ignition and explosion propagation.

Mine Surfaces Washed Down with Garden Hose

In large producing mines, sprinklers are employed to wash down the coal dust on ribs, roof, and along roadways, using 50 to 100 ft. lengths of hose of the garden type. These methods have been supplemented, in a large number of operations by spraying water onto the cutterbars of mining machines to wet the coal dust during the process of undercutting. It can be safely stated that fully 90 per cent of the dust formed in Alabama mines comes from the face, and it has only been in the last two years that attention has been concentrated upon laying such dust at its source.

Where coal is undercut with mining machines, without the use of water at the cutter head, large clouds of dust are raised in the air. Furthermore, while the machine cuttings (bug dust) are being hauled, considerable leakage occurs through the cracks in the car bodies thereby increasing the quantity of dust along roadways. Since the introduction of water at the cutter chains, practically no dust is raised during the process of undercutting and the spillage and leakage of coal along roadways has been reduced to a minimum. In fact so great has been this reduction that there has been a considerable decrease in the number of road cleaners employed as compared to the number necessary before the introduction of water at the cutterbar.

The sprinkler systems installed in some of the mines of Alabama are among the best and most thorough in the United States. Pipe lines from tanks are laid from the surface or are connected with the discharge of pumps. Water is then carried to the face of all working places, where sprinkling is performed by men employed especially for this purpose. Fig. 26 shows the method of sprinkling in one of the mines and illustrates the care with which the coal faces are washed down.

From experiments performed at the mines, it was found that twenty-one times as much dust is raised at the face while coal is being undercut with machines as is raised by trips traveling at various speeds along the haulageway. It was ascertained further that five times as much dust is raised at the face while miners are loading coal as is raised by moving trips.

At shaft bottoms, under former methods, great clouds of dust were raised during dumping operations. Since dust has been attacked at the face, however, practically no visible quantity of it is thrown into the air during car discharge operations underground. The most strik-

ing change, however, has taken place in tipples on the surface. Under former conditions, tipples were enveloped during the greater part of the shift in large clouds of coal dust, but at present, the atmosphere surrounding them is clear.

Sprinkling Systems Have Averted Explosions

The cost of maintaining efficient sprinkling systems in Alabama is quite variable, depending on the output. It ranges from a few cents to 6c. per ton. Such a system, of course, is quite expensive to maintain, but it can be safely stated that, in the past few years, explosions originating in the interior of certain mines have been prevented from propagating throughout the workings by the efficient system of sprinkling employed.

Considerable interest is being manifested in this district at present in the use of rock dust as an explosion preventive. Insurance carriers, as well as the Federal government, have been active in the promotion of rock dusting in this state. It is only a matter of a short time until even the most efficient methods of explosion prevention by the use of water will be supplanted by the use of rock dust.

In addition to the strides that have been made by reason of the introduction of permissible explosives supplanting black blasting powder, the substitution of mining machines for solid shooting methods, and the use of water for laying coal dust, together with the interest manifested in the use of rock dust, some of the mines have, within the past few years, introduced permissible electric cap lamps. The progress in this direction has been rather slow, but it is only a matter of a short time until a more extensive use of closed lights will be adopted, especially in the gaseous mines.

Since the Bureau of Mines established a rescue station in the Birmingham district, several thousand miners have been trained in first-aid and rescue work throughout the state. It is now quite rare to find a mine that does not employ a large number of men trained in first-aid and safety methods and in the use and care of breathing apparatus. These courses of instruction have done much to educate the miner in safety practices. Some of the larger operations in the district have been carrying on the training of their employees in first-aid and rescue work from their own central rescue stations. The Mining Department of the University of Alabama has provided a course in mining for mine foremen and the more ambitious men about the coal operations are availing themselves of this opportunity. This course covers from four to six weeks, and the charge, including board, is nominal.

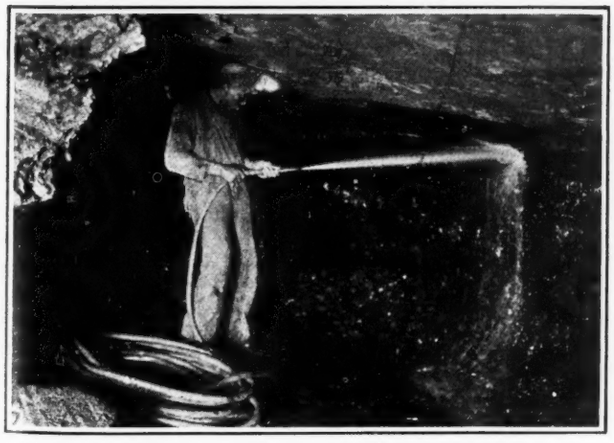


Fig. 26—Washing Down Ribs, Floor and Roof

In order to keep down the coal dust in Alabama mines not only is the cutterbar of the mining machine sprayed but the mine surfaces are washed with a hose as here shown. Dust is a dangerous enemy to mine safety.

In some mines throughout the state, mainly as a safety measure, section foremen are employed. These operations are divided into sections of several entries each. Each section has a foreman, who superintends the timbering, the handling of explosives, and other safety measures, as well as the production of coal. Where this system has been adopted, accidents have been greatly reduced.

In the employment of labor, some mines follow what is known as a contract system. By this arrangement the contractor is paid a margin above the digging price, and acts in the capacity of a section foreman.

In Alabama, as in other states, the more progressive and humane operators add to their cost per ton by utilizing precautionary measures, while the less progressive operators sometimes disregard ordinary safety standards. As a result, during periods of fierce competition the progressive operators are at a disadvantage. While the principle of "less government in business" is, as a rule, sound, at the same time it must be conceded that a certain degree of government supervision is necessary when human life is at stake. The only means by which safety standards, applicable to all producers of coal, can be fixed, is through the action of the Federal government.

Excellent Morale Pervades Mine Labor

Alabama has made its own mine labor, which consists chiefly of native whites and negroes in the approximate proportion of half and half. There are some operations where 75 per cent or more of the employees are negroes. The state has been non-union since 1908. There have been two invasions by the United Mine Workers of America—in 1917, and a final effort in 1920 and 1921. The union failed in its efforts to organize the state because of the loyalty of the miners. It has been found that the best class of both whites and negroes have no desire to unite in the same organization; this feeling is deep rooted and sincere.

The operators of mines in Alabama are not unmindful of the fact that under non-union operation there is added responsibility on their part that cannot be shirked. In the last 10 years, conscience has been awakened to a sense of the duty that all men bear each to the other but more particularly the relation of the employer toward the employee. In addition, the white man is beginning to appreciate the value of the negro and to realize that after all each race has a common purpose and, in their respective spheres, should work for the good of all. In the main, the old argument, so often advanced by union organizers, namely, "absentee ownership" does not apply to Alabama, where many mine owners either live at their mines or visit them at regular and frequent intervals. Close acquaintanceship, which means common sympathies and mutual aims, is, after all, the basis for the best and most lasting relationship of man to man.

In the preparation of this paper, I am indebted to J. J. Forbes, District Mining Engineer, Bureau of Mines, Birmingham; C. H. Nesbitt, Chief Mining Inspector, also of Birmingham; J. L. Davidson, Secretary of the Alabama Mining Institute, and to the operating officials of many of the coal mining companies of the state for their assistance.

Mine Engineers Inspect Big Progress in Southland

American Institute Men Touring Appalachians See O'Toole's 50-Ft. Cutter and Loader, Jones' Big Loading Machine and Other Coal Mine Developments — Trip Through Many Fields Ends in Alabama Meeting

BY R. DAWSON HALL
Engineering Editor, *Coal Age*

IN A SPECIAL train of six cars, four of which were sleepers, the American Institute of Mining and Metallurgical Engineers made a visit to the mines of the southern Appalachian region, starting from Washington, D. C., Oct. 7, holding sessions here and there and winding up in Alabama ten days later. They skipped the rich coal fields of Kentucky and Tennessee but visited those of the Pocahontas region, the zinc and copper mines of eastern Tennessee and the iron and coal mines of Alabama. By annual tours such as these, the members qualify themselves to take a broader view of the problems of their profession.

In the early days of the tour, while they were guests of the Southern Appalachian Coal Operators' Association, they had an opportunity to see the coal dry-cleaning plant at McComas, W. Va., the Jim Elwood Jones "Coloder," a big capacity machine combining scraper and conveyor, and Gen. Edward O'Toole's immense cutting and loading machine operating a 50-ft. cutterbar and drag scraper. They saw other interesting coal mining developments en route, and the coal men in the party learned a good deal in copper and iron mines which might be of profit to the coal industry. The trip, of course, included dinners and sightseeing stops, as this annual tour always does, closing with a visit to Muscle Shoals.

A BLOW AT OUR TAXERS

Col. Arthur S. Dwight, in his speech at the Washington dinner of the institute Oct. 7, declared that the city of New York might have the wealth of the country in its charge but that Washington has discovered a way for relieving it of that wealth to such a degree that it seemed as if Washington one day might become the rich and New York the poor city of the commonwealth.

Herbert Hoover, Secretary of Commerce, said that though large taxation was necessarily imposed, he supposed no engineer would take exception to $65,000,000 annually which was expended in original research work, a sum equal to only 2½ per cent of the entire expenditure of the government. Part of this expense was due to the necessary regulative action of government. It is, he said, the only part of the government's expenditures that is reproductive. It returns its cost a thousand fold in reduced taxation.

Mr. Hoover declared that we could profitably double our expenditures for research. Unfortunately, we give our scientific staffs inadequate compensation. The highest salary paid is $7,500 a year and that is given to scientists whose work is more largely administrative than scientific. The salary paid is rarely over $5,000 a year and the average is but $2,900.

Recently the government (U. S. Bureau of Standards) was prosecuting an inquiry into the ignition of gasoline in co-operation with an automobile association. An explosion occurred killing several of the experimenters. Twenty-two persons were deprived of their means of support by that accident but under the regulations the government could pay them an aggregate of only $930 a year and had to look to outside organizations to supplement this meager compensation fund.

Mr. Hoover declared that all this was wrong, that men should not be asked to make such sacrifices on behalf of the government. They were entitled to pay commensurate with their talents.

PUBLIC LIFE NEEDS MORE ENGINEERS

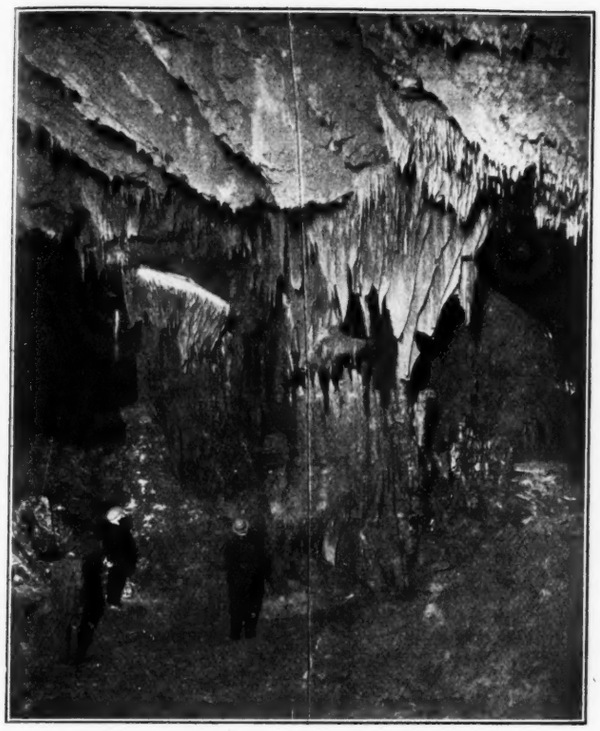
A tribute was then paid to the engineer by Mr. Hoover. "The engineer," said he, "is a servant of the truth. He is not swayed by his emotions but solely by facts, by truth. His interest is in physical forces and quantities. He believes in what he can prove and not in what he merely would like to prove. His is the guardianship of the fact. We should have more such men in public life. The engineer need not enter the national employ to help in rendering such service. He can, in his capacity as citizen, use his talent for reasoning on facts and thus aid in directing the policies of the nation."

The effect of emotion on politics was greatly deplored by Mr. Hoover. Recently, said he, he desired his secretary to find the facts on which the government ownership advocates based their arguments. The only tangible fact on which they relied was that at the Niagara Falls bridge the lights on the Canadian side with government ownership cost one-third as much as those on the United States' side with private plants. On this one fact was based the argument for an investment of 40 billions of dollars and the employment by the federal government of three million men. The question of ownership, whether public or private should not rest on opinion but on well-weighed facts.

MINING KEEPS RAILROADS BUSY

Mr. Dwight remarked that 54 per cent of the tonnage on American railroads consisted of mineral products and 30 per cent of the revenue derived from transportation came from the carriage of these products. The importance of the industry, even during the present depression, made its unfavorable condition a matter of national concern, especially as it had resulted in the idleness of many capable mining engineers for the activities of whom the institute was trying to discover a new outlet. Among the other speakers were George S. Rice and President William Kelly.

That evening the visitors, about 72 in number, left for Luray cavern near Roanoke, Va. The cavern is a grotto or series of irregular passages, the result of solution and erosion in Silurian limestones and clays. The cavern has deepened with time. From the roof hang stalactites which look singularly menacing to a coal-mine man. Fortunately when struck they give out a pure and not a drummy note, so to all appearance



"The Chapel" in the Grottoes of the Shenandoah

In this grotto not only stalactites and stalagmites excite the wonder of the beholder, but natural rock much like the flies in a theater hang down over the fairy scene giving a most unusual effect. On the left can be seen a shield like a canopy and draped below with stalactites, standing almost without visible means of support. It is not as much inclined as many others.

they are not likely to fall, at least for some years.

In the Grottoes of the Shenandoah, visited by the party in the afternoon, the measures are vertical or nearly so in contrast to those at Luray which are almost horizontal. The appearance was therefore like the scenery in a theater stage as seen from under instead of behind the scenes. There, strange "shields" (probably of siliceous matter) had to all appearance partly fallen from the roof and become supported at varying angles on the bottom. They had then become cemented to the roof by the deposition of mineralized waters. In time the bottom of the cavern on which they fell was dissolved away and the shield can now be seen supported by the roof at one tip at what seems an impossible angle.

No Fireboss Would Permit This

The rock thus suspended may weigh several tons. Ajax shield is 50 ft. above the floor; others are lower. The fire boss would certainly mark "Danger" against the area where the shield appears, yet mysteriously it is most firmly supported at its upper tip at an angle of 45 deg. to the vertical.

As the caverns are near the surface, nowhere much more than 200 ft. below the grass roots and as there is no oxidation to keep them warm the temperature is about 54 deg. the year round. The owner at Luray has taken due advantage of this fact and is ventilating his house with the pure temperate air of the cavern. He has adopted this means of keeping an even temperature in his house the year round. Before many years we also may be striving to get a similar result by artificial refrigeration and the use of fans though at a somewhat greater expense than that which the owner of the Luray cavern is incurring.

The morning of Thursday found the party at Bluefield ready for an early start. Most of the technical men visited the mine of the American Coal Co. of Alleghany County, at McComas, W. Va., to see the dry-cleaning plant. The coal at the mine comes out in lumps as large as any in the Pocahontas region, but the loading of the coal produces an immense quantity of dust even though care is taken to make the drop a minimum. The dust is so thick that the mine inspector has forbidden smoking on the tipple.

Less Dust in Dry Cleaning Now

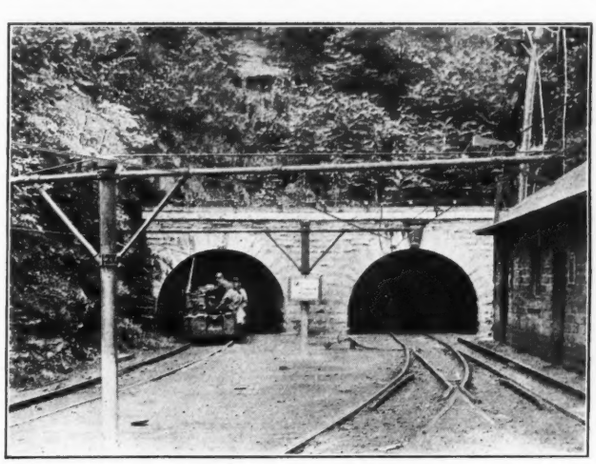
In the rescreening plant, which has been described at length in a previous issue of this journal, the dust is distinctly less in evidence. Unfortunately a little dust escapes and lodges on the floors and structural steel rafters. It is of course the finest of the dust. Should it become dislodged it might be sufficient to cause a small flare-up and explosion which might in turn dislodge more dust. On the whole, however, the impression gained is that the dry-cleaning plant is freer of hazards than the ordinary tipple, and the use of electric lamps tends to reduce the risk to a minimum.

Some of the finer dust, which would make excellent foundry facings, is escaping from the collectors and passing into the air almost like smoke. By use of the Cottrell system it might be saved, but the cost would be large, and the sale of foundry-facing material seems so limited as not to encourage a heavy investment in its collection.

Leaving the plant a visit was made to the Pocahontas Fuel Co.'s Delta mine at Switchback, which the members entered by a convenient opening at Maybeury. Here they saw the J. Elwood Jones machine, the "Coloder," at work in a short room 18 ft. wide. The machine is 6 ft. wide in front. The coal is crowded onto a drag scraper and is transferred to a conveyor and back to the car. With three placements of the machine the whole face is cleaned up.

Conditions are favorable in Delta mine. The coal is about 7 or 8 ft. thick; it is clean, and has a splendid roof and good floor. Cars have to be spotted one at a time behind the machine and for this reason its output is reduced.

Lunch was served at the Club House at Gary, W. Va., with Gen. Edward O'Toole as host. The party had



Entrance to Baby Mine, Pocahontas Fuel Co.

The visitors had a good chance to see the intensive development and the excellent roads between Bluefield and Gary. This is one of the many mines clustered in McDowell, Mercer, Wyoming and Tazewell counties and located in the justly celebrated Pocahontas coal field. It is located in the village of Pocahontas, Va.

swelled to several hundred. The visitors traveled about two miles to the No. 6 mine at Ream to see the O'Toole machine which is now working on a room pillar. The room is perhaps 25 ft. wide, and the rib being drawn is a little under 50 ft. in width. A cutterbar 50 ft. long undercuts the face of the pillar, which, being under considerable weight, tends to fall as fast as it is undercut.

Men with picks, however, are stationed along the face to bring the coal down should it fail to fall. It drops onto a drag scraper which carries it to the room roadway elevating it above the cars which stand in a trip at the loading point. A change has been made in the jacks used in moving the machine forward. One-hundred ton hydraulic jacks hold up the roof at the working face. It is probable that these will be replaced later by jacks of 150-ton capacity. The screw jacks which move the cutter and the conveyor forward each press against the base of a hydraulic jack and are operated by the driving mechanism of the cutting and loading machine.

How O'Toole's Machine Advances

The movement forward is automatic. However, the mechanism is so arranged that any screw jack can at pleasure be thrown out of operation. This is done whenever the hydraulic jack is to be moved up. The jack screws are 8 ft. long and advance the cutter and conveyor a distance of 6 ft. By moving forward one hydraulic jack at a time the cutterbar and conveyor need not at any time be stopped. The forward movement is continuous. There are always jacks enough in operation to move the machine ahead.

The bits drag the cuttings toward the edge of the pillar adjacent to the room track and here this fine coal is shoveled by hand onto the drag scraper. In order to support the roadway so that a trip can be stationed with its hindmost car well back in the goaf, heavy posts 18 in. to 2 ft. in diameter are placed along the track. The hydraulic jacks are provided with blocking on top, which can be rapidly and easily removed as soon as the water pressure on any one jack is relieved.

Some of the visitors went to the pulverized-coal plant at Gary. The Gary power station is using for fuel the waste from the picking tables, the railroad and mine-road cleanings. The material used runs from 25 to 50 per cent ash. The coal is pulverized in two Fuller-Lehigh mills so that 90 per cent goes through a 200-mesh screen. Practically all the power needed is generated in two 800-hp. boilers which are run at 200 to 250 per cent of rating.

Tipple and Sizing Plant, Pocahontas Fuel Co.

For a low-volatile coal region, Pocahontas has coal that with proper treatment gives unusual opportunity for sizing. It makes a bad dust and when dumped into barges at the coast gets badly broken, but with care it will make a fair proportion of lumpy fuel well suited to open grates or the usual house furnace.

The coal is fed at the top of the combustion chamber with just enough air to carry it to the burners at the required velocity. There it burns, supplied with air introduced through openings in the combustion chamber. The fine ash falls to the bottom and remains a dust so long as it is not permitted to pile up high enough to reach the zone of intense heat.

New Use for Boiler-Room Ash

Vitus Klier, the chemist, is experimenting on the use of the "sand" which is the result of this intense combustion for the making of road and sidewalk surfacing material. When the ash is at such a temperature that it will not fuse and yet will effectually melt road tar, it will be mixed with that material, the whole being spread and rolled to an even surface.

The committee of the Pocahontas Coal Operators' Association which was entertaining the engineers, distributed an interesting little book containing the itinerary, a description of the region and a folding map, also an insert relative to the electrification of the Norfolk & Western R.R.

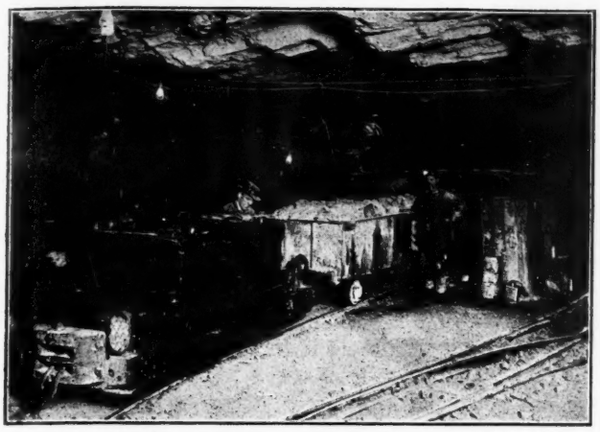
Friday morning, Oct. 10, the Institute train arrived at Mascot, Tenn., and one of the American Zinc Co.'s mines was visited. At this operation some of the openings were about 120 ft. deep, approximately 200 ft. long and over 100 ft. wide. The size of these mammoth stopes demonstrates quite clearly the strength of the roof in this mine. The roof cannot be tested as in coal mines but accidents in connection with it are rare. Unfortunately coal mines are not provided with a dolomite roof. If they were, accidents from falls would be far less frequent.

A Tip for Coal-Company Farmers

The company has an experimental farm which is kept in good condition by the use of the pulverized dolomite from its zinc mill. The corporation lays great stress on this agricultural effort setting thereby a good example to some coal companies which let their farms run down till their product will no longer pay the taxes. The American Zinc Co.'s farm is a good advertisement for its dolomitic product. Though the coal operator has no byproduct of this kind to sell there is no reason why he should prove himself the least thrifty farmer in the vicinity in which he operates. A large concrete culvert at Mascot prevents creek water from entering the mine and flooding the workings.

In the afternoon visits were made to the quarries of the Appalachian Marble Co., and the Gray Knox Marble Co., also the mill of the Knoxville Marble Co. Here the marble was squared, polished and in some cases reduced to slabs. In the evening the visitors were entertained at the Whittle Springs Hotel, about five miles from Knoxville, both a dinner and a dance being provided. Philip N. Moore's thoughtful speech on that occasion portrayed the new view of the engineer as to what are the essential elements in preparing for the practice of his profession. He believed that the engineer should have a broad education that would teach him not only the technical facts of his vocation but something of the arts by which the mental horizon of man was broadened. He questioned whether specialized technical ability could be acquired at college.

"When," said he, "we arrive at the ideal, an engineer



At the Mines of the American Zinc Co.

Photography only with great difficulty could be employed to convey the profundities of the artificial caverns at Mascot, Tenn. The roadways, often in the hanging wall or the footwall which are barren rock, are apt to be much like those in coal mining as is the one shown here, but in the stopes from which the ore has been drawn, the flood-lights provided for the occasion, only inadequately conveyed to the visitors the tremendous outlines of the enveloping pillars and roofs, and merely gave a rough sense of the immensity of their gigantic proportions.

will not be hired as a porter to do a special job at the behest of someone less able to do it but he will himself be manager and director, with the forces of the company that engages him wholly under his command. Today the lawyer and the banker direct, and the engineer fetches and carries for them."

In the early morning of Oct. 11 the train left for Ducktown, Tenn., arriving in time for lunch. In the afternoon the party went down the McPherson shaft and returned by way of the Burra Burra shaft, of the Tennessee Copper Co. At this mine and in other metal mines the compressed air pipes are kept above the floor, resting either on old drill shanks or on iron rods that are bent around them so as to embrace the pipe. All the chutes are closed by radial steel gates which cut off the movement of the ore by an upward motion. This is more certain than one that is downward, because in this instance the gate movement cannot be stopped by the flow of ore. The gate is moved by two racks and pinions, the pinions being near either end of a shaft rotated by a hand crank.

This Clock Might Serve a Coal Mine

At each shaft is a "clock" showing the number of lost-time accidents that have occured during the current month, there being twelve points on the dial. The legend runs: "When a man is injured the hand moves. Can we go a month without moving the hands? This clock shows the number of lost-time accidents at this mine during the month. Below is a statement of the lost-time accidents for every month during the current year."

These three practices might be imitated with advantage by coal-mine companies. The metal mines, piped for compressed air, are not particularly wet, but the water may be unusually severe on pipe owing to its corrosive action. Coal-mine chutes are usually so planned that the gates close downward, not upward. In consequence they have to crush the coal if they are to be closed. In some cases they may choke and fail to stop the flow of coal. The upward-moving gate on the other hand, if it strikes a big chunk merely lifts it up by its end and proceeds to shut off the flow of ore in a positive manner and not merely by a choking of the current. The clock method of dealing with lost-time accidents might be adapted to any mine.

Later in the day inspections were made by the engineers of the smelter and acid plant. In years gone by after the fumes from ore roasting had destroyed the grass over several square miles of territory and the floods had carved the unprotected ground into a badly gullied area and swept away the soil that had been accumulating for centuries, the company was compelled by North Carolina and Georgia to put in an acid plant. As a result 1,200 tons of 60- and 66-deg. sulphuric acid are now made per day.

Is There Money in Mine Water?

The production of copper is unprofitable at present prices, but the sale of the acid brings in an appreciable return. It would be at least worth while for coal companies to make further experiments to ascertain whether it would be possible to treat the waters from their mines so as to produce a not unprofitable by-product therefrom and so protect the creeks into which water from the mines is being discharged.

In the evening of Saturday, Oct. 11, the train went on to Chickamauga, and Sunday was pleasurably spent viewing the various battlefields in the vicinity.

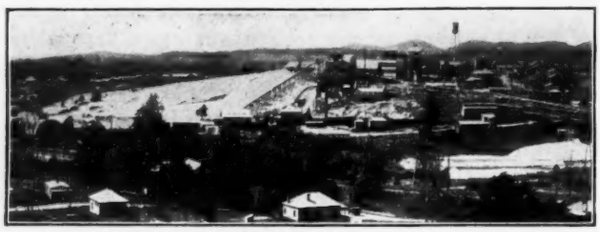
At noon, the institute members were entertained at the Whittle Springs Hotel, on Signal Mountain, Col. William S. Shields, president of the Knoxville City National Bank being toastmaster. Addresses were made by Frank Bane, director of the Knoxville department of public welfare; William Kelly, president of the institute; Dr. Harcourt A. Morgan, president of the University of Tennessee; P. N. Moore, construction engineer and geologist, of St. Louis, and Wilbur Nelson, state geologist. The secretary of Knoxville Automobile Club delighted the audience by some well-rendered songs and a characterization of a negro pastor.

In the evening the special train moved on to Birmingham, where a technical session was held on Monday morning, conducted by George Gordon Crawford, president, Tennessee Coal, Iron & R.R. Co., chairman of the committee of arrangements. After an acknowledgment by Mr. Kelly of the welcome tendered by Mr. Crawford, H. S. Geismer briefed his paper on "Coal-Washing Practice in Alabama." In the discussion that followed Mr. Geismer said that three operators producing coal for the market had introduced coal-washing tables but that none of the companies producing iron were using tables for the cleaning of their fine coal. Frank H. Crockard, president, Woodward Iron Co., elicited the fact that at one point six mines were operating and seven washers, yet, in the reservoir below, gold fish had established themselves and had thrived so well that they had become an actual nuisance. Erskine Ramsay, chief engineer, Pratt Consolidated Coal Co., said that the water used in washing was saved, even that draining off the cars below the tipple being put back through the washer. Mr. Fies said that the mine water was probably acid, but that he had been surprised to find that the sludge water in the washery was alkaline.

F. W. Miller, manager, byproduct division, Sloss-Sheffield Steel & Iron Co., made brief remarks regarding his paper on "Byproduct Coking in Alabama." Theodore Swann, president, Federal Phosphorus Co., spoke on the value of phosphoric acid in the fixation of ammonia, declaring that it combined as satisfactorily with ammonia as sulphuric acid and made a more valuable fertilizer. It created more heat in the reaction but

not enough to occasion any difficulty. A product containing 60.5 per cent of phosphoric acid and 14.5 per cent of ammonia was obtained.

Milton H. Fies, vice-president, De Bardeleben Coal Corporation, then gave a brief outline of his paper on "Alabama Coal-Mining Practices," laying emphasis on the precautions being put in force in Alabama and regretting that, owing to local conditions, the record was not as good as in some other states. He said he had been much criticized for his advocacy in his paper of Federal legislation for the protection of mine workers. L. E. Bryant, of Tennessee, remarked that one mine was spending 15c. per ton of coal solely with the idea of promoting safety and added later that one of the Belgian experts who had been invited over by this government had remarked to him that safety provisions in Europe had doubled the labor cost of producing coal, bankrupted many of the companies in Germany, France and Belgium and caused the formation of syndicates for the purpose of sustaining prices at a level which would make such elaborate safety provisions feasible.



Mascot Mine of American Zinc Co. near Knoxville

Part of the tailings from the jigs are used for commercial purposes, such as road and railroad ballast. Some of the jig tailings and all the flotation tailings are crushed and used for fertilizing purposes and as paint filler.

In this connection R. D. Hall remarked that in many cases the laws in one state were so much more severe than in another with which it had to compete that a desire arose for a greater uniformity of safety practice such as a Federal law would maintain. However, there were not many who wished the Government to undertake this regulation, which under the Constitution as now written would be without warrant. R. V. Norris said that the present state laws were not inadequate and were well suited to state conditions. He believed that safe production was cheap production and that a Federal law covering mines in all states was not desired nor desirable.

George S. Rice said that joint action between the states without Federal action was preferable. Uniformity of the laws was an end to be sought and it was to be hoped that it might be attained under Federal initiative. He said the recent laws passed in Great Britain had improved her accident rate and that better laws in the United States might have a similar effect.

The Federal government regulated, through the U. S. Bureau of Mines, the operation of mines leased from the nation. From these mines about 2,000,000 tons were produced annually. It must be remembered, however, that the accident rate was normally high in such mines because it chanced that the beds thus operated pitched heavily, increasing the natural hazard. In reference to Mr. Feis' statement that "It is only the matter of a short time until even our most efficient methods of water prevention will be supplanted by the use of rock dust as an explosion preventive," Mr. Rice said that in Great Britain rockdusting is required everywhere in bituminous coal mines whether naturally wet or dry. Central France has not yet arrived at rockdusting, Germany is coming to it rapidly both in the Ruhr district and in Silesia, after a long period of firm faith in the value of water. Other mining regions of Europe are warm advocates of the value of rockdusting.

W. K. Kavanaugh, president, Southern Coal, Coke & Mining Co., of St. Louis, said that he believed that the state laws were in the main satisfactory and did not establish any unfair production-cost differentials between states.

The afternoon session concerned itself solely with metallurgical problems and the evening with geology and the working of iron ore. W. R. Crane, superintendent, Southern Experiment Station, U. S. Bureau of Mines, Birmingham-Tuscaloosa, Ala., showed wonderful slides exhibiting the methods of working the red iron ore and the effect of crush on mine pillars.

In between the afternoon and evening sessions a visit was made to the Shannon red iron ore mine of the Gulf States Steel Co., where a slope inclined at 52 deg. goes down 2,400 ft. to the iron-ore bed 1,900 ft. below the surface. There is little difference between a coal mine and any one of the many red iron ore mines of the Birmingham district, this Shannon mine, it is said, simulating a coal mine by having in its atmosphere a small quantity of methane.

The rooms are driven as in coal mining, leaving about 51 per cent in pillars. The work is unusual for this district in that the advance is in the lower 8-ft. bench, which is usually too siliceous for the profitable manufacture of iron. When a room has gone its due length the upper 12 ft. of ore is removed and the roof allowed to fall in on the retreat. The iron ore in the pillars is left. The roof is of shale and needs careful watching, and the bottom at times will heave, if overloaded. The inclined shaft, or slope, was driven by another company and without timbering. It fell in when about 20 ft. from the ore and had to be heavily concreted for its entire length.

Day coaches were provided for the itinerary that occupied to overflowing the second and third days' stay in the Birmingham district. On Tuesday visits were made to Ishkooda No. 13 ore mine, of the Tennessee Coal, Iron & R.R. Co., the No. 1 ore mine of the Woodward Iron Co. and the Muscoda No. 6 ore mine of the Tennessee Coal, Iron & R.R. Co. The party then went to Bayview and was entertained at a barbecue. At this place is a coal mine, an impounding reservoir and a village of the Tennessee company.

The coal mines of the Birmingham region have in general a character all their own, due partly, doubtless, to the influence of the adjacent and associated ore mines of the district and partly also in the case of the mines owned by the steel companies to the fact that the breakage of the coal is a matter of no importance though skips probably need not be a cause of coal breakage if properly handled. At Bayview the coal is raised in a huge skip on a slope driven through sandstone at an inclination of 26½ deg. The bed worked is the Pratt seam. The mine produces 2,400 tons a day. To those accustomed to the rapid movement at a shaft with cages the leisurely efficiency of the big skip is a marvel to behold. The coal is washed in three-compartment jigs. As this washery was described by H. S. Geismer in the issue of Oct. 9 it is not necessary to say more about it here.

The train then moved on to Edgewater, another mine

of the Tennessee company with a most unusual hoist having two drums in balance. One hoists from an upper landing at a depth of 238 ft. and another from a landing at 380 ft., 142 ft. below. They both hoist from the Pratt seam which is faulted at that point, the throw being about 140 ft. The drums are made of unequal diameters so that the hoist will raise a load from the lower landing in the same length of time as it will lower another load to the upper landing and vice versa. The clean coal in the bed is 56 in. thick.

The output has been 6,002 tons in a single day, but the mine produces regularly about 4,000 tons daily. The shaft which is 420 ft. deep serves an area of 4,000 acres which contains 30,000,000 tons of clean coal. About 1,200 men are employed. The main hoisting shaft is lined with concrete. The air shaft is 12 ft. in diameter, and the manway is 800 ft. long and measures 7x12 ft. The visitors inspected the coal washer, the hoisting and boiler houses, the machine shop, supply house, bathhouse and store.

The trip concluded with a trip to the Fairfield coke works of the Tennessee company and the Fairfield wire mill of the American Steel and Wire Co. and the members noted with interest the manufacture of wire fence, wire nails and barbed-wire.

In the evening the Industrial Relations Committee of the American Institute of Mining and Metallurgical Engineers held an open meeting in the Hotel Tutwiler addressed by Frank H. Crockard, president, Woodward Iron Co., the subject of Mr. Crockard's remarks being the industrial relations in the coal-mining industry of the Birmingham district. Mr. Crockard pointed out that the companies of the region felt to the full their obligation to pay fair wages, to see that checkweighmen were provided and to arrange for the settlement of grievances.

They did not believe that wages altogether out of line with those in the district for other kinds of labor should be paid by the coal-mining industry. They were insistent on the appointment of checkweighmen and in fact brought pressure to bear on their workmen to provide them. After providing for the settlement of grievances they were not pleased to find that none were presented, and they told their foreman and subbosses that they would hold them responsible for the failure of their men to present grievances which the companies felt sure existed.

After this expression of their displeasure and earnest intention to hear and redress grievances the complaints began to come in, and now the provisions for adjustment were being duly received and carefully adjudicated. The meeting was presided over by R. Dawson Hall. Simultaneously the directors with a representative group of institute members dined at the hotel.

The next morning, Wednesday, the party assembled on the train for a trip which embraced Ensley blast furnace No. 6, No. 1 steam plant and openhearth plant and the Fairfield car works and steel works of the Tennessee company, the plant of the Phoenix Portland Cement Co. and the Tarrant City pipe works of the National Cast Iron Pipe Co. At the Portland Cement works, lunch was served, and the party visited the open pit in which the limestone was being mined by steam shovels, the factory where the materials—limestone, shale also from the vicinity and a small quantity of gypsum—were crushed and mixed and where the mixture was calcined and ground.

Perhaps the most interesting visit was to the Tarrant plant. Here cast-iron pipe was being manufactured by the de Lavaud process. This process to quote Richard Moldenke's paper, which by the way was not read at the technical sessions, "consisted in rotating a steel mold at a high rate of speed, introducing therein the proper quantity of molten iron, which through centrifugal force is spread over the mold and this makes the pipe." The molten iron is introduced at bottom of the mold and gradually fed into it as it recedes at such a speed that the interior of the mold is covered evenly by the molten iron to the required thickness. No inner core is provided. The centrifugal action makes the iron thus cast unusually dense and therefore strong. In consequence without any reduction of strength it can be made only 75 per cent as heavy as is customary.

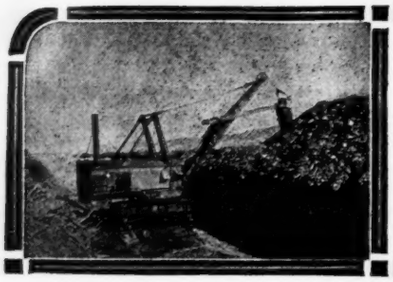
The bell is cast in the same way as the pipe proper and by the same operation. The pipe thus made is remarkably smooth but being cast in a water-cooled mold is too hard on its exterior surface. This chill is corrected in an annealing furnace in which the heat is gradually imposed and removed. After this the pipe is cleaned, dipped and tested. The company still makes the pipe by the sand-mold process, which takes 72 hr. for the completion of the entire operation from the making of the mold to the testing of pipe, both inclusive. The new pipe are made, annealed, dipped and tested in 3 hr.

In the evening of Wednesday a banquet was held at the Birmingham Country Club at which the speakers were William Kelly, J. V. W. Reynders and John McLeish, the last named being the Director of the Mines Branch of the Canadian Geological Survey. George Gordon Crawford presided.

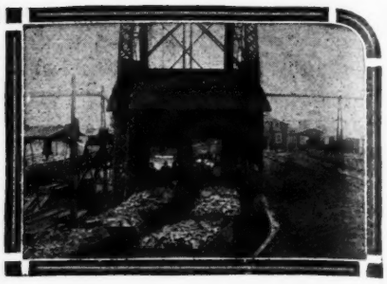
Next morning the party visited Muscle Shoals dam which was explored from top to bottom, the members and guests going down the penstocks by ladders and thence down the Moody spreading draft tubes. A visit was made to nitrate plant No. 2 where nitrates were made by the cyanamid process. The plant will develop 80,000 hp. at low water and 600,000 hp. for 25 per cent of the time provided turbines and generating machinery are provided for that purpose. The intention is to install at an early date enough units to develop 240,000 hp. whenever that quantity of water power is available. Late that evening the party left for Washington arriving at midnight of Friday after several days of strenuous activity but with happy memories of a visit that none of the party will forget as long as he lives.

Blast Furnace of Tennessee Company at Ensley, Ala.

At this plant are six skip-filled blast furnaces each having four stoves which are heated by waste gases and which raise the blast to 1,300 deg. F.



News Of the Industry



Soft-Coal Industry Takes Belated Steps To Meet Fuel-Oil Competition

National Coal Association Authorizes Program of Research—Interests of Coal and Oil Producers Similar, Both Suffering from Overdevelopment—May Join Hands to Effect Economies

By Paul Wooton
Washington Correspondent of *Coal Age*

That the bituminous-coal industry is taking cognizance as never before of fuel-oil competition was indicated clearly at the recent meeting of the board of directors of the National Coal Association. The board has given its unqualified approval to the research committee which Harry L. Gandy, the association's secretary, had set up without authorization on the chance that the directors would hold up his hands. Not only was a program of research authorized but the members of the board indicated clearly that the time has passed when the industry can afford to ignore the competition which oil is offering.

There have been fuel-oil menaces before. In the swing of the economic cycle this competition would diminish to the point where sight was lost of the fact that it has for many years been an important competitor. Oil and coal are competitive sources of power and heat. Ordinarily oil can compete importantly only when power is produced in internal combustion engines whose greater thermal efficiency, lighter weight and adaptability to small scale installation have offset a much higher unit price.

The extraordinary development of the gasoline engine has robbed coal of much of the increase which otherwise would have come in the consumption of that fuel. The average coal man does not realize that gasoline has been a serious competitor for thirty years, but the facts are that this country has an installation in automobiles of 400,000,000 hp., as compared with an installation of 70,000,000 hp. in steam-driven transportation. This gives an indication of the potential demand which would have been supplied in part at least by coal had it not been captured by gasoline.

There has been a keener realization of the competitive possibilities of fuel oil because it could be visualized burning in the same equipment which formerly used coal. In the past fuel oil menaces have been caused chiefly by the high cost of coal. The present invasion of fuel oil is made possible by the low price of petroleum. It was brought about largely by the simultaneous discovery in 1923 of six record-breaking pools, Smackover, Powell, Huntington Beach, Santa Fe Springs, Long Beach and Tonkawa. All of these great pools reached the peak of their production within a few months of each other and contributed to the greatest overproduction of crude petroleum since the Cushing field days of 1914.

Instead of the interests of the coal producer and the oil producer being in conflict they really are identical. It is only natural that the oil producer, finding himself with a great supply which he cannot choke off, should seek new markets. The condition, however, which drives him into the boiler-fuel market is a very unsatisfactory one to him, just as an overproduction of coal makes for an unsatisfactory state of the coal business.

Too Many Mines and Wells

Oil and coal are suffering from the same trouble—the tendency to overproduce. There are too many mines and there are too many oil wells. The thought now is being put out from a high official source that there must be co-operative action within the industry to prevent waste and hold development in check until additional supplies are needed. While the idea is directed primarily toward preventing the production of oversupplies of oil there also is official consideration being given a joining of hands by the producers of the two great fuels in an effort to effect colossal economies.

While the present wave of fuel-oil competition has lasted longer than any of its predecessors the time will come when it will recede. In fact there are signs already that production at the new pools is on the downgrade. But unless constructive steps are taken to bring about co-operation to prevent overproduction, a new glut of oil will be forthcoming before long with the discovery of some other field or because of the present significant trend of carrying oil production to new depths.

Even if the United States should run through its reserves of flowing oil there will be new floods of it from Mexico, from the Caribbean, from South America, or some other source. These waves of overproduction will keep on coming. For that reason it is argued that men in the coal and oil industries should take common counsel and effect a revision of the antiquated laws which at present compel waste and overproduction. The competition is of a character that the coal industry cannot meet alone. If the price of coal be reduced through wage cuts or other expedients it simply will mean that the level of fuel-oil prices will be reduced. There can be no bottom to price when there is an oversupply which must be disposed of.

Fuel oil for domestic use is quite another problem. The industrial user will turn back to coal just as quickly as oil ceases to be the best bargain in B.t.u.'s. The domestic user is discovering that oil has more than its B.t.u. content. It is clean and convenient. The thousands of householders now using oil will not go back to coal if oil prices rise. They have been spoiled by the simplicity of the oil burner. They will not burden themselves again with the dust and the ashes of coal in this day of few domestic servants. It will be just as hard to change them as it would be to wean the anthracite users of New England from their diet of stove and chestnut. The bituminous industry must find a way to give coal the same convenience and cleanliness as oil now affords. The consensus is that this will not be particularly difficult if the coal producers will stimulate the necessary experimentation.

House Heating Antiquated

It is curious that the attention to fuel economy which has revolutionized power-plant practice in recent years has not been widened to include house heating. The average house-heating plant today is a medieval thing still burning lumps and paying fancy prices for them. Stoking still is done by hand. The toting of ashes is as prevalent now as one hundred years ago. Fuel is burned raw and waste gases go up the stack. Radiation losses average as high as ever and there continues to be alternate under- and overheating of rooms. In fact, all of the things which are regarded as bad boiler-room practice are the rule in the handling of house-heating plants.

If the National Coal Association will hold out sufficient inducements—and the producers of coal have more to gain than has anyone else—way soon will be found to burn coal as a powder or as a gas. Automatic stokers will be devised. Combustion will be controlled by thermostats. The question is more one of how and when rather than will it be done. It may take a long time to work out the problems if they are left to individual inventors working on shoestring resources, but if the research is properly financed results may be expected promptly.

Ruhr Coal Syndicate Gets $2,500,000 Credit Here

An acceptance credit to the extent of $2,500,000, which a few weeks ago was under negotiation between representatives of the Ruhr Coal Syndicate and a group of American financiers, has finally been arranged, it became known last week, the American bankers in the transaction being Goldman, Sachs & Co. The credit is to finance the export of Ruhr coal, in which German industrialists such as the Krupps, Stinnes and others are interested.

This move is regarded as forecasting the participation of American bankers in the financing of other major European industries, especially since the Allies have insisted that the Ruhr coal operations constituted the backbone of the whole industrial program of Central Europe, with steel, iron and other industries absolutely dependent upon Ruhr coal.

Penna Sees Black Future For Union Coal Fields

Phil H. Penna, secretary of the Indiana Bituminous Coal Operators' Association, is not optimistic concerning the coal industry in Indiana or in any union field for that matter, and he objects to the fact that a government report terms Indiana's business "good."

"There is no hope for the coal industry during the life of the Jacksonville agreement," stated Mr. Penna, referring to the contract executed by the United Mine Workers and the operators of the union fields at Jacksonville, Fla., last January.

"My opinion," Mr. Penna said, "is based upon two facts: First, that the nation is now taking its ordinary requirement of ten million tons weekly, and second, that the surplus of the non-union fields could be utilized and will be utilized, if the country ever requires it, before our coal will be wanted. With the nation getting its required amount now, and with a large surplus supply of non-union coal in store, how can the union operators expect a revival of the industry in their fields?"

Reports compiled by the Indiana Coal Traffic Bureau show an increase in production in the Indiana field within the last month of 225,204 tons, but it is of little consequence, according to Mr. Penna. The domestic demand probably is the cause of the increase, but the percentage of production which goes for domestic use is very small in normal times.

"During the week ending Sept. 27," he said, "the Indiana mines worked 41 per cent of potential time; the Illinois mines 50 per cent; the southern Ohio field 20 per cent; the Pittsburgh field 49 per cent, and the northern and central Ohio fields 66 per cent. The northern and central Ohio fields enjoy a much better business than the other fields named because they are close to the lakes and have the advantage of the lakes for shipping.

"The non-union fields of Kentucky work an average of 73 per cent, the Logan non-union field worked 63 per cent during the week ending Sept. 27, the Pocahontas non-union field worked 75 per cent, the Winding Gulf non-union field worked 57 per cent, the Panhandle non-union field worked 61 per cent, and the Westmoreland non-union field, near the Pittsburgh union field, worked 57 per cent.

"The non-union fields, the report shows, are working about two-thirds of the time, while the Indiana mines are working much less than half time."

Union in West Kentucky Is Dying Hard

Miners in what is left of the union district 23, in western Kentucky, declare the resignation this month of President Lonnie Jackson and the appointment of West Ames to fill the vacancy signifies no change in the union no-surrender policy. The region has been on strike for six months and half of western Kentucky is working non-union. The former president is publicly declaring, however, that the Lewis policy of "no backward step" is dead wrong and that western Kentucky is being sacrificed to the bullheadedness of the union administration. He urges that a reduction in wages be allowed so that the union can continue in the region. Jackson has favored a wage cut ever since the strike started, but Lewis ordered him to continue the strike or resign. He resigned.

Will Strive to Bring Public And Operators Closer

Instructing its committees to speed up their work in an effort to better serve the public, the National Coal Association, through its board of directors, in session at Washington last week, took steps to broaden the sphere of the association's activities. The association purposes, through its own efforts, bringing about a more satisfactory use of coal and a closer relationship between operators and their customers and the public.

The submission of a questionnaire to retail dealers and household users of coal in order that the industry may definitely ascertain the public viewpoint, was authorized at a meeting of the new Research Committee of the association and later confirmed by action of the board.

To bring about uniform accounting methods in connection with Bureau of Internal Revenue reports, a special tax and cost accounting committee was authorized.

There was apparent a desire to eliminate any basis for criticism, and the meeting is said to have been one of the most successful the National Coal Association has ever held. It was attended by directors from 14 bituminous coal producing states and was presided over by S. Pemberton Hutchinson, of Philadelphia, the new president.

Miners Call Off Strike at Glen Alden Collieries

Scranton, Pa., Oct. 20.—The recent strike called by the general grievance committees of the Glen Alden Coal Co. miners in Luzerne and Lackawanna valleys has ended. The strike was called in defiance of the district and International union leaders. W. W. Inglis, president of the coal company, as a member of the conciliation board, sent a telegram to International President Lewis of the miners' union calling his attention to the threatened strike and Mr. Lewis in turn notified the district leaders to try to halt the walkout, but in spite of his efforts several thousand men failed to report for work on Oct. 15. It is said that because of the illegal walkout the charters of certain locals at Glen Alden mines will be revoked by the International union.

New York Bids Numerous and Wide in Range

Bids opened on Oct. 14 by the Board of Purchase of New York City for furnishing and delivering to various city departments 68,917 net tons of various sizes of anthracite, resulted in the following tenders:

Borough of Manhattan—10,589 tons egg coal, $12.57 to $13.98 per ton; 1,667 tons stove coal, $12.96 to $14.62; 605 tons chestnut coal, $12.93 to $14.62; 810 tons pea coal, $8.87 to $9.55; 1,170 tons broken coal, $11.93 to $13.50; 12,000 tons No. 1 buckwheat, $5.76 to $6.50, and 84 tons Georges Creek Cumberland coal, $8.10 to $10.50.

Borough of Brooklyn—8,300 tons egg coal, $12.47 to $12.62 per ton; 1,836 tons stove coal, $12.61 to $14.62; 390 tons chestnut coal, $12.61 to $14.62; 146 tons pea coal, $9.04; 10,000 tons No. 1 buckwheat, $5.76 to $5.89, and three tons Georges Creek Cumberland coal, $9 to $9.04.

Borough of Queens—2,925 tons egg coal, $12.61 to $13.50 per ton; 124 tons stove coal, $13.25 to $14.25; 232 tons chestnut coal, $12.98 to $14.62; 144 tons pea coal, $9.04 to $9.41; 3,000 tons No. 1 buckwheat coal, $5.76 to $6.40, and three tons Georges Creek Cumberland coal, $7.90 to $9.04.

Borough of the Bronx—4,005 tons egg coal, $12.62 to $13.73 per ton; 1,131 tons stove coal, $13.04 to $14.62; 149 tons chestnut coal, $12.93 to $14.62; 850 tons pea coal, $8.87 to $9.55; 5,000 tons No. 1 buckwheat coal, $5.73 to $6.40, and 24 tons Georges Creek Cumberland coal, $8.10 to $9.04.

Borough of Richmond—805 tons egg coal, $12.13 to $13.90 per ton; 61 tons stove coal, $12.48 to $14.62; 150 tons chestnut coal, $12.48 to $14.62; 21 tons pea coal, $9.11 to $10.50, and 1,000 tons No. 1 buckwheat, $5.93 to $6.75.

For furnishing and delivering 230 net tons of egg coal to the Bronx Park Department bids ranged from $12.83 to $14.25 per ton.

The time of delivery of the above tonnages, with the exception of that for the Bronx Park Department, is to March 31, 1925. The tonnage for the Park Department is to be delivered by Dec. 31 of this year.

Rate from Pocahontas Field To Washington Lowered

The Interstate Commerce Commission has authorized a departure from the fourth section of the Interstate Commerce Act, which will give Washington, D. C., a much lower rate on coal from the Pocahontas field. The rates which will be in effect as soon as the tariffs can be published are $2.84 from the Pocahontas district, $3.09 from the Thacker district, and $3.19 from the Kenova district. The effort to effect this departure from the fourth section was a part of the movement toward making available at lower prices substitutes for anthracite. When the commission last year undertook its investigation to ascertain whether or not substitutes for anthracite could be made available in New England and the North Atlantic states, George S. Pope, manager of the Government Fuel Yard in Washington, asked that the Norfolk & Western R.R. be required to establish rates from the Pocahontas field to Washington on the same basis as those in effect from the New River field.

The Norfolk & Western was willing to put the rates into effect, but a difficulty arose by reason of the fact that the rates from the Pocahontas field to points on the Southern Ry. between Lynchburg and Washington were higher than the proposed rate to Washington. For this reason it was necessary to obtain authority before a lower rate could be charged to Washington than was in effect to intermediate points.

End West Virginia Strike After Six Months

A strike of 800 miners of the Kelly's Creek Colliery Co., at Ward, W. Va., which has dragged along for six months, came to an end Oct. 17 when it was announced that the concern had signed an agreement with the United Mine Workers of America, under the 1923 scale. A similar contract was signed by the Miners & Consumers Coal Co., employing 130 men, at Morrisville, W. Va.

These two companies are the only concerns in this field operating under union agreements. Negotiations with other companies are under way.

Keeney Says Miners Should Not Vote for Davis

Labor organizations should oppose the candidacy of John W. Davis for the presidency, said C. F. Keeney, former president of district No. 17, of the United Mine Workers (West Virginia), and William Blizzard, an aide, in an interview in Indianapolis, Ind., recently. The two men assert that they represent District 17 in opposing the candidacy of Mr. Davis on the ground that he has the support of "the great anti-union combine of industrial interests in West Virginia which has seized control of government there and converted the agencies of public authority into instruments of private warfare upon labor unions and organizations of workers."

Coolidge Decries Federal Control of Industries

Speaking at Philadelphia, President Coolidge opposed government control of railroads, industries and utilities. "If the people lose control of the arteries of trade and the natural resources of mechanical power, the nationalization of all industry could soon be expected," the President said. "Through the breaking down of the powers of the courts lies an easy way to confiscation of property. With railways and utilities under political control, the domination of a group would be so intrenched in government that the privilege of citizenship would consist largely in payment of taxes. Leave the people in the ownership of their property."

Says Big Four Should Build Connection to Dering Mine

The Big Four R.R. should be ordered to make switch connections with the coal mine of the J. K. Dering Co. at Eldorado, Ill., in the opinion of W. P. Bartel, of the staff of the Interstate Commerce Commission, in his report to the commission. The coal company alleges that the failure of the Big Four to establish connections with its siding has made impossible the full development of its 3,400 acres of coal land in Saline County, where it has 30,000,000 tons of coal still unmined. At present the property is served only by the Illinois Central, which is not in a position to handle the 3,500 tons which the mine can produce daily.

The railroad company contends that the building and maintenance of such track as the coal company has constructed is not authorized by its state charter; that such a track, by reason of contracts with the Illinois Central and the Southern Illinois Railway & Power Co., under the law of Illinois, is a public track and that an order requiring the extension of the Big Four tracks in effect would be the taking of property without due process of law; that the connection is not practicable and will not furnish sufficient business to justify its construction; and that the proposed connection with a new railway has not been authorized under the state law. It is the conclusion of the staff of the Commerce Commission that there is sufficient business to justify the connection and that it can be put in with safety.

Coronado Case Up Again

The latest phase of the noted Coronado coal case, an appeal by Finley, receiver, against the United Mine Workers of America, will be heard by the U. S. Supreme Court on Monday, Jan. 5, a motion to advance the argument having been granted Oct. 20. The case involves the financial responsibility of the international union and subordinate organizations for damages to mining property in Arkansas suffered during strike disorders. This is the second time the issue has been before the Supreme Court.

Coke Output in 1923 Makes Record for the Industry

Output of beehive and byproduct coke combined in 1923, according to final returns by the U. S. Geological Survey, was 56,977,000 net tons, the largest in any year in the history of the industry, even exceeding the war-time maximum. The final figures are 2.7 per cent higher than the preliminary estimates published Jan. 15, 1924.

Of the production, 37,597,664 tons, valued at $257,591,318, or about 66 per cent of the total, consisted of byproduct coke, while 19,379,870 tons, valued at $115,905,580, was beehive coke. The average yield of coke from coal in the case of byproduct fuel was 69.3 per cent, while in the case of beehive coke it was 64.4 per cent.

The returns involved 11,156 byproduct ovens, of which 3,094 are in Pennsylvania, 1,619 in Ohio, 1,213 in Indiana and 1,196 in Alabama, with the others scattered. The byproduct coke used in blast furnaces or affiliated work amounted to 27,055,397 tons, valued at $168,379,600.

Merchant sales of furnace byproduct coke totaled 1,460,538 tons, valued at $9,847,055, while sales of byproduct coke for foundry use aggregated 1,897,955 tons, valued at $19,995,342. Byproducts obtained from coke oven operations and sold in 1923 were valued at $112,075,945. Of this total 884,952,912 lb., valued at $25,954,413, consisted of ammonia sulphate as against a production of 915,926,762 lb. Motor benzol products totaled 80,467,883 gallons, while the amount sold exceeded this somewhat and consisted of 80,480,326 gallons, valued at $13,145,833.

Of the beehive coke produced last year, 6,437,771 tons, valued at $39,326,693, consisted of merchant sales of the furnace grade, while foundry beehive coke sales amounted to 1,702,764 tons, valued at $12,259,196. The production of beehive coke reported came from 62,349 ovens, of which 37,578 are in Pennsylvania, 8,055 in West Virginia, 6,199 in Alabama, 3,284 in Virginia, 1,767 in Tennessee, 1,758 in Colorado, and 1,030 in New Mexico, the remainder being scattered.

Important Cases Reassigned By Supreme Court

Among the important cases set for argument before the U. S. Supreme Court on Nov. 10, which have been reassigned for Nov. 17, are the Cranberry Creek Coal Co. case questioning the legality of the anthracite tax imposed in the State of Pennsylvania and one involving the constitutionality of the Kansas Industrial Relations Act, attacked by the Charles Wolff Packing Co.

Coal to the extent of 3,121,576 tons was used in connection with the manufacture of glass during 1923, the Bureau of the Census reports. Similar figures covering other industries are as follows: Photo-engraving, 2,748 tons; enameling and japanning, 13,923 tons; lasts and related products, 12,014 tons.

Finance Coal Storage by Recourse to Banks and Employers, Engineers Say

Banks will finance storage for employers, and employers will finance storage for wage earners, according to a report just made by the Coal Storage Committee of the American Engineering Council on the feasibility of financing coal in storage.

Because of financial and housing conditions many wage earners cannot store their coal without financial aid in some form. "Several employers," says the engineers' report, "purchase and store a quantity of coal which is subsequently sold to employees at cost. A few render aid only in periods of severe coal shortage. Another obtains coal from a dealer, paying in full and deducting payments in reasonable installments. Several sell their byproduct coke and coke breeze at cost.

"In one company an employee mutual benefit association forms to pool purchases for members. A number of plants operate and handle on a club plan. One concern allows employees to select a dealer to whom the company pays in full, deducting the amount from wages in equal installments.

"Another organization purchases a run of mine coal and picks out lumps which are sold to employees at very low cost, the company utilizing the remainder. One company charges cost plus a reasonable amount to cover the expense of a man competent to handle purchases and delivery."

In general, according to the American Engineering Council's report, it may be said that satisfactory arrangements can be made to finance the storage of coal and very much in the same way that other transactions are financed, that is by bank loan, deferred payments, or carrying the account with operating capital.

Howard W. Showalter

President of the Diamond Coal Co., Fairmont, W. Va., and named by Governor Morgan as one of the delegates to represent West Virginia at the annual convention of the American Mining Congress, at Sacramento, Cal., Sept. 29-Oct. 2.

Coal Consumption and Power Output by Utilities Climb

Electric public-utility plants consumed 2,948,998 net tons of coal during August, according to a report by the Geological Survey. This compares with 2,787,724 tons consumed in July and 2,679,859 tons in June, according to revised figures. Fuel oil consumed by utility plants during August totaled 1,498,730 barrels, compared with 1,431,310 barrels in July and 1,344,632 barrels in June.

The average daily production of electricity by public-utility power plants during August was 152,700,000 kw.-hr., which is about 2⅜ per cent greater than the daily output during July.

Dominion Government to Aid Shipment of Coal to Central Canadian Districts

Shipment of Maritime Provinces coal to central Canada is to receive government assistance, providing the railways make reductions in their present published freight rates on coal. Under an order-in-council, just passed by the Dominion Cabinet, Charles Stewart, Minister of Mines, is enabled to pay a subvention of ½c. per ton mile on coal shipped wholly by rail from eastern Canada to stations in Ontario and Quebec west of Riviere du Loup. On waterborne coal from the Maritime Provinces the same subvention is allowed on the railway haul from the port of transshipment to destination.

This assistance will be given out of an appropriation voted last session by Parliament to aid in the transportation of Western and Eastern coal to central Canada. At that time it was thought that with this aid considerable quantities of coal from Alberta would be placed on the markets in central Canada. But the prolonged strike in that Western province makes such a development unlikely this season. Of the $200,000 voted not more than $150,000, according to the terms of the order-in-council, may be used to assist the transportation of coal from eastern Canada.

An important restriction in regard to the subvention is that the government will not give more than 50c. a net ton on any single shipment, nor are payments to be made where Canadian coal is not in competition with United States coal. No grant will be given on shipments for use on railway locomotives.

The Dominion Fuel Board, which will administer the grant, reports that the railways concerned have already agreed to make a reduction in their coal rates.

Output and Value of Coal Produced in the United States, by States, in 1923

(Compiled by the U. S. Geological Survey)

State	Loaded at Mines for Shipment (Net Tons)	Sold to Local Trade and Used by Employees (Net Tons)	Used at Mines for Steam and Heat (Net Tons)	Made Into Coke at Mines (Net Tons)	Total Quantity (Net Tons)	Total Value	Average Value per Ton	Number of Employees — Underground — Miners (a)	Underground — All Others	Surface	Total	Average Number of Days Worked
Alabama	19,520,634	370,754	307,356	258,905	20,457,649	$51,624,000	$2.52	17,304	7,330	5,401	30,035	232
Alaska	104,867	12,734	2,225	.....	119,826	755,000	6.30	73	48	78	199	220
Arkansas	1,245,350	12,845	38,697	.....	1,296,892	5,192,000	4.01	2,124	846	784	3,754	97
California, Idaho and Oregon	11,256	1,555	7,255	.....	20,066	79,000	3.94	43	26	24	93	206
Colorado	9,390,124	534,464	231,595	190,035	10,346,218	33,299,000	3.22	8,064	3,114	2,162	13,340	174
Georgia	48,172	733	2,554	24,161	75,620	327,000	4.32	69	23	75	167	231
Illinois	73,842,388	3,606,769	1,860,918	.....	79,310,075	198,388,000	2.50	64,194	24,900	10,620	99,714	158
Indiana	24,951,649	697,832	579,618	.....	26,229,099	65,046,000	2.48	22,777	8,228	4,403	35,408	136
Iowa	5,027,502	556,180	127,053	.....	5,710,735	20,517,000	3.59	7,797	2,709	942	11,448	181
Kansas	3,833,377	119,752	82,275	.....	4,035,404	12,981,000	3.22	5,534	1,269	982	7,785	149
Kentucky	43,149,962	844,094	552,943	230,318	44,777,317	113,542,000	2.54	33,911	16,546	10,354	60,811	152
Maryland	2,181,688	77,823	26,415	.....	2,285,926	6,911,000	3.02	2,360	814	551	3,725	178
Michigan	1,086,198	16,235	69,642	.....	1,172,075	5,545,000	4.73	1,213	580	184	1,977	222
Missouri	3,101,275	211,447	90,429	.....	3,403,151	11,575,000	3.40	4,217	1,335	1,400	6,952	155
Montana	2,934,829	118,060	94,789	.....	3,147,678	9,652,000	3.07	2,054	910	547	3,511	179
New Mexico	2,572,465	38,684	46,689	257,335	2,915,173	10,668,000	3.66	2,522	1,025	548	4,095	216
North Carolina	29,419	1,700	4,900	.....	36,019	132,000	3.66	55	70	25	150	275
North Dakota	1,128,318	218,574	38,508	.....	1,385,400	3,275,000	2.36	883	257	481	1,621	182
Ohio	37,273,886	2,672,268	600,289	.....	40,546,443	98,610,000	2.43	34,121	12,225	8,209	54,555	150
Oklahoma	2,722,387	37,998	117,022	7,631	2,885,038	10,874,000	3.77	4,100	1,930	1,100	7,130	133
Pennsylvania (bitumin.)	138,275,133	7,359,213	2,507,227	23,738,340	171,879,913	472,217,000	2.75	120,385	46,183	28,413	194,981	213
South Dakota	2,000	8,379	.....	.....	10,379	25,000	2.41	34	.....	.....	34	122
Tennessee	5,614,117	119,657	115,783	190,711	6,040,268	16,515,000	2.73	6,752	2,733	1,759	11,244	183
Texas	1,156,901	6,564	23,864	.....	1,187,329	2,162,000	1.82	1,641	493	318	2,452	178
Utah	4,179,293	56,471	81,399	403,054	4,720,217	13,657,000	2.89	2,379	1,063	939	4,381	160
Virginia	10,292,691	212,131	96,041	1,160,780	11,761,643	32,468,000	2.76	6,810	4,841	2,469	14,120	212
Washington	2,697,984	80,881	87,973	59,554	2,926,392	10,894,000	3.72	2,313	1,147	846	4,306	213
West Virginia	101,961,199	3,841,346	758,904	1,338,492	107,899,941	285,481,000	2.65	62,676	35,207	19,417	117,300	169
Wyoming	7,264,816	97,567	212,648	.....	7,575,031	20,916,000	2.76	4,203	2,020	1,306	7,529	192
Total, bituminous including wagon mines	505,599,880	21,932,710	8,765,011	27,859,316	564,156,917	1,513,327,000	2.68	420,608	177,872	104,337	702,817	179
Pennsylvania (anthra.)	82,239,037	3,248,352	7,851,620	.....	93,339,009	506,787,000	5.43	72,362	42,359	43,022	157,743	268
Grand total	587,838,917	25,181,062	16,616,631	27,859,316	657,495,926	2,020,114,000	3.07	492,970	220,231	147,359	860,560	195

(a) Includes also loaders and shotfirers.

Jury Must Convict Before Contempt Sentence

Section 22 of the Clayton Act requiring conviction by a jury as a condition precedent to sentence for contempt of court, if a trial before a jury is demanded, constitutes a valid restriction upon the inherent judicial powers of a U. S. district court, the U. S. Supreme Court held Oct. 20 in replying to a question from the Sixth Circuit Court of Appeals.

The question arose in the appeal of S. C. Sandefur, who was sentenced for contempt by a federal district court in Kentucky on a charge of having violated an injunction against the use of threats and violence during a strike against the Canoe Creek Coal Co. Sandefur was denied a trial by jury on the contempt charge, and appealed, whereupon the Circuit Court of Appeals referred the construction of this clause of the Clayton Act to the Supreme Court for interpretation.

At the same time the Supreme Court, in the appeal of Sam Michaelson and others who were convicted of contempt in Wisconsin on charges of violating an injunction issued the Chicago, St. Paul & Omaha R.R. during the shopmen's strike in 1922, went more fully into Section 22 of the Clayton Act and held that the striking employees were entitled to trial by jury on contempt charges. The District Court and the Seventh Circuit Court of Appeals in this case had held this part of the act unconstitutional. This decision was reversed by the Supreme Court in a decision rendered through Justice Sutherland.

Trade Associations to Study Uniform Cost Accounting

Representatives of more than 300 trade associations have been invited to attend a conference on uniform cost accounting to be held at the Congress Hotel, Chicago, Oct. 28 and 29. The meeting will be the third of a series held under the auspices of the Department of Manufacture of the Chamber of Commerce of the United States for the purpose of furthering interest in systematic cost accounting work.

The preliminary program for the Chicago conference lists two subjects for consideration on the opening day. One of these is "The Bankers' Interest in Uniform Cost Accounting," to be discussed by J. W. O'Leary, vice-president of the Chicago Trust Company, and the other "The Printer, Uniform Cost Accounting, and the Federal Trade Commission." The latter subject will be discussed by two speakers who will go into the question of the Federal Trade Commission's attitude toward uniform cost accounting activities.

In announcing the preliminary plans for the meeting, E. W. McCullough, manager of the Chamber's Department of Manufacture, makes the point that the adoption of uniform cost accounting by an industry does not mean the destruction of individual systems now in use but only adjusting them in harmony with uniform methods. "Few individual systems," he says, "attain the accuracy and facility of operation found in uniform systems built by the members of an industry who, after careful study, have combined the best found in individual practice, adding to it by way of improvement and advance in technique found in other lines. The advantage of the same practical revision of a uniform system from time to time should not be overlooked."

Boys Build Pretty Bonfire With Stolen Dynamite

On the basis of information by school teachers that schoolboys had dynamite in their possession, Pottsville (Pa.) police made an investigation last week and announced that three pupils, all less than twelve years old, had confessed taking a box of dynamite from the Sherman Coal Co. and had used the sticks for kindling wood. The boys said they had built a fire with forty of the sticks because they made such "pretty blue flames." The police confiscated the remainder of the loot.

Names N. C. A. Committee to U. S. Chamber of Commerce

Representatives of the National Coal Association at the second mid-year meeting of the Eastern Division of the Chamber of Commerce of the United States, which will be held in Washington on Oct. 23 and 24, have been appointed by S. Pemberton Hutchinson, president of the association, as follows: C. W. Watson, president, Consolidation Coal Co., New York City; Michael Gallagher, general manager, M. A. Hanna Co., Cleveland, Ohio; C. C. Watt, president, Loyal Hanna Coal & Coke Co., Philadelphia, Pa.; John L. Kemmerer, president, Whitney & Kemmerer Coal Co., New York City; William A. Evans, vice-president, National Coal Co., New York City; C. E. Bockus, president, Clinchfield Coal Corp., New York City, and J. G. Bradley, president, Elk River Coal & Lumber Co., Dundon, W. Va. Other representatives to the Northern Central, Southern Central and Western Division meetings which will be held at Indianapolis, Memphis and Los Angeles, respectively, will be announced later.

World Coal Output for First Half of This Year 655,000,000 Metric Tons

World production of coal during the first half of 1924, according to the U. S. Geological Survey, was approximately 655,000,000 tons, or at the rate of 1,310,000,000 tons a year. This rate was less than that of 1923 but far above 1922 or 1921, and almost equal to the output of 1920. The present level of coal production, however, is still below that of 1913.

In comparison with the corresponding period of 1923 the preliminary figures show a decrease of about 5 per cent. The largest element in this decrease was the lessened production of the United States, as American consumers drew upon the heavy stocks they had accumulated last year.

Among the European countries the United Kingdom and Poland also show a decline in comparison with 1923. This decline was more than offset by the partial recovery of German production from the low levels touched during the occupation of the Ruhr. Most of the other European countries also increased their output.

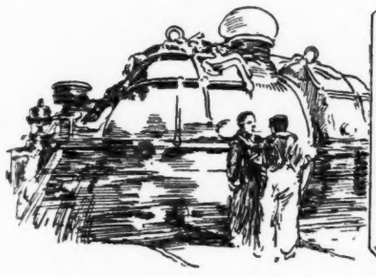
The following table, prepared by W. I. Whiteside, of the Section of Foreign Mineral Reserves, summarizes all information received by the Geological Survey up to Oct. 1 and is subject to material revision as final official figures are received. Lignite and brown coal are included; where possible they are shown separately.

Coal Output of Principal Countries of the World, January-June, 1924, In Comparison with Corresponding Period of 1923

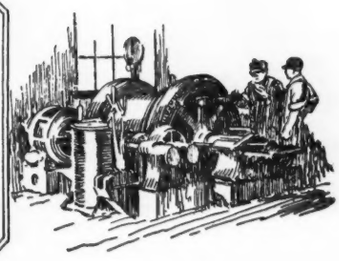
(In metric tons of 2,204.622 lb.)

Country		1923	1924	Per Cent of Total 1924
North America:				
Canada		a8,003,516	6,160,812	.94
United States		a294,324,000	248,099,000	37.87
Other countries		(b)	(b)	(b)
South America:				
Chile		(b)	715,000	.1
Other countries		(b)	(b)	(b)
Europe:				
Austria	Coal	74,698	83,639	.01
	Lignite	1,242,196	1,422,510	.22
Belgium		11,127,700	12,298,810	1.88
Czechoslovakia	Coal	5,919,835	7,503,500	1.15
	Lignite	8,725,861	10,346,649	1.58
France	Coal	17,659,350	21,555,062	3.29
	Lignite	433,741	472,050	.07
Germany	Coal c	38,776,959	51,498,099	7.86
	Lignite	65,358,313	58,305,616	8.9
Saar		2,688,654	6,911,638	1.06
Hungary		3,807,521	d4,000,000	.61
Netherlands		2,686,246	2,835,000	.43
Poland		a18,255,005	15,686,452	2.39
Russia (including Russia in Asia)		5,609,000	d7,000,000	1.07
United Kingdom		143,051,102	141,293,539	21.57
Yugoslavia		2,063,000	2,000,000	.3
Other countries		(b)	(b)	(b)
Asia:				
British India		10,074,000	11,263,000	1.72
Japan		a15,879,000	a14,000,000	2.14
Other countries e		(b)	(b)	(b)
Africa:				
Rhodesia		250,447	274,318	.04
Union of South Africa		5,222,674	5,528,735	.84
Other countries		(b)	(b)	(b)
Oceania		(b)	(b)	(b)
Total		686,000,000	655,000,000	100

a Revised figures. *b* Estimate included in total. *c* Exclusive of Saar, which is shown separately. *d* Estimated from incomplete data. *e* Russia in Asia included with Russia in Europe.



Practical Pointers For Electrical And Mechanical Men



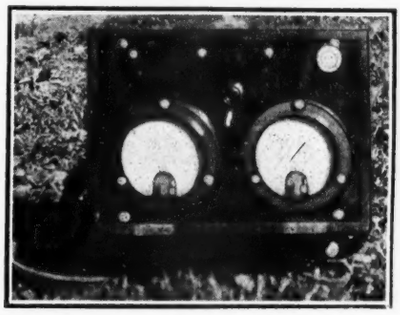
Few Bond Testers Tell the Truth But Here's One That Will

Instruments Usually Fail To Give Correct Indications of Resistance of Bonds—Accurate Results Obtained by Twin Millivoltmeter Type of Tester

AFTER almost a year's study of methods of bonding and types of bonds, our company decided that much of the controversy over bonding was due to the fact that no instruments were made which gave a correct indication of the resistance of a bond. We therefore designed a bond tester which gives the exact resistance of a bond. After thoroughly proving its suitability we have had one built for each of our larger operations.

The contact bar looks much the same as most types, but whereas the contacts before were all solidly fixed, 3 ft. apart, on ours only the middle contact is fixed; the outer clips are movable. With the old contact bar, where the distance between contacts was fixed at 3 ft., when testing a short 6-in. bond, the result was that six inches of bond and thirty inches of rail was being compared with three feet of rail. Thus this type of tester greatly favored the short bond.

On ours, the middle contact is placed at one end of the bond, an end contact on the bar is set at the other end of the bond and the other contact is set to cover an equal length of rail. Thus with the 6-in. bond, both end contacts would be set six inches from the middle clip and we are comparing six inches of bond with six inches of rail, giving the correct relation between their resistances.



This is the Truth-Telling Meter for Bonds

Two millivoltmeters indicate the voltage drop across the bonded section and an equal length of rail. The ratio between the two readings tells the condition of the bond.

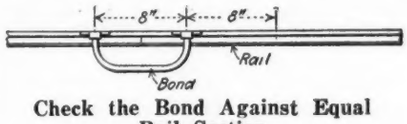
The contacts are pieces of hack saw blades clamped in a copper terminal clip. The fixed central contact has a compression spring arrangement to allow it to adjust itself vertically to an uneven rail joint, giving a solid contact on all three clips.

The testing instrument itself is of entirely different design from most instruments. Many bond testers are based in some form of a Wheatstone bridge. One prominent type has the bond balanced against three feet of rail, plus the resistance necessary to form a balance. This resistance is cut in by a sliding arm which also carries a pointer showing the proportion cut in. Another make replaces this variable resistance by a sliding contact on the rail which is adjusted to form a balance. The amount of rail necessary for this balance can then be measured. Two pairs of fixed resistances are often used in these types giving proportions of 1 to 1 or 10 to 1.

Our bond testing instrument is of the twin millivoltmeter type. Its general appearance is shown in the illustration. Instead of having to balance a bridge, always a more or less delicate operation, the operator merely compares the two millivoltmeter readings. As shown in the wiring diagram there are two resistances *R* and *R'* connected in series with each millivoltmeter, which may be shunted by a double-pole switch *S*. This switch is shown in the upper right hand corner of the picture. In the normal position it is open and the resistance is cut in, when closed it short-circuits the resistance only as long as the button is held in. This is so that the meters will not be accidently connected directly across a defective bond.

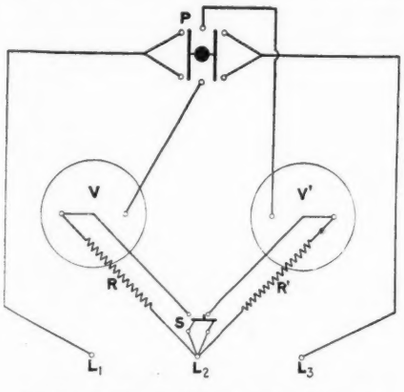
When making a test, the switch is first left open; afterwards it is closed if the bond is intact. The millivoltmeters are ruggedly constructed with 0-100 millivolt scales. The double-pole double-throw switch (*P* in the wiring diagram) is shown as the pointer near the center of the picture illustrating the meter it is provided to easily reverse the connections to the meters in case the readings are reversed.

When the instrument is in operation lead *L* 2 is connected to the center contact bar clip and *L* 1 and *L* 3 to the end contacts. These clips are adjusted to cover the bond and an equal length of rail. If the readings of the meters are reversed, turning switch *P* will change the connection. If the readings are sufficiently low the switch *S* is pressed and the voltmeters are connected directly to the rail while if the readings are high the bond is immediately pronounced defective. With the resistance cut out, readings of each meter are taken and the ratio found.



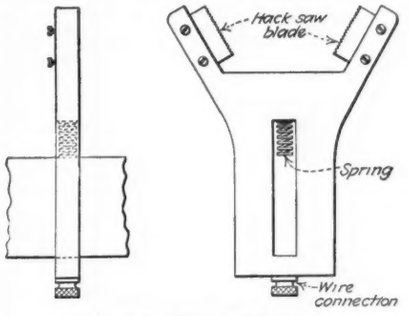
Check the Bond Against Equal Rail Section

Unless the bonded section of the rail is compared with an equal length of the same size rail incorrect results are obtained. A bond-testing outfit must be adjustable to obtain accurate results.



Internal Connections of Instrument

The line terminals *L* 1, *L* 2 and *L* 3 are connected to the corresponding point on the contact bar applied to the rail and bonded section. Series resistances *R* and *R'* protect the millivoltmeters *V* and *V*1. *S* is a short-circuiting switch to shunt these resistances. *P* is a polarity-reversing switch.



Contact Makers Which Form Good Connections

Rigid contact bars and terminals will not fit uneven rails. Self-adjusting terminals form best connections and at the same time protect the instruments. Tested leads between the contacts at the rail and the instruments are also necessary for accurate readings.

This is then compared with that given in the table, which is pasted in each instrument case. If it is higher than that shown in Bond Limit Value Table I, the bond is defective.

These bond testers have been in use for some time at our mines and are considered very satisfactory.

F. FRAZER MACWILLIAMS,
Power Department.
Pennsylvania Coal & Coke Corp.,
Cresson, Pa.

Keep Truck Wheels Lined And Stop the Wiggle

Many bus and truck operators are not aware that the front axles and steering knuckles are so designed that when the wheels are mounted they assume an angle in relation to the chassis frame, both in a vertical and horizontal position; then again the front axle is mounted on the springs in such a manner as to form a slight angle with the chassis frame. Altogether we have three different angles to consider.

The amount of angularity in each case is determined accurately when the vehicle is built and must be so maintained during its operation. Difficult steering, rapid tire wear and even loss of performance ability may be the penalties for neglect of this little-considered point.

The first of these three angles is under-gather, sometimes known as cambre, or incorrectly as dish, which consists of a slight outward leaning at the top of each wheel. This serves several purposes. It places the wheels more nearly perpendicular to the crown of the road. It converts some of the normal radial load on the wheel bearings into a thrust inward, thereby relieving the axle spindle nut of thrust. It gives greater stability against side-thrusts, as in rounding curves, because the inner wheel is always inclined slightly inward of the turn, so that some of the thrust is taken endwise by the spokes, or edgewise by the disk, in a disk wheel, where there is greater strength.

WHY WHEELS GRIND

But an inclined wheel has a natural tendency to travel in a circle instead of in a straight line, and if it is constrained to do the latter its tire will no longer roll straight along the road, but will continually grind, thereby wearing rapidly and consuming extra power. To correct this tendency, therefore, the second kind of inclination, namely fore-gather or toe-in is used. This consists of drawing together the front wheels so they are "pigeon-toed." If this fore-gather is figured correctly for the amount of under-gather, the wheels will practically have a true rolling contact and will roll straight.

Third among the trinity of inclinations of motor truck front wheels is what is known as the castor. This is an inclination of the axle itself, whereby the steering knuckles are not vertical, as we usually think of them, but lean backward at the top. This has the same effect as the off-center pivoting of the castors on a piece of furniture. It tends to make the truck travel in a straight line. If it were not for this castor effect, there would be continual tendency for the truck to run off the road and when the wheels were turned the driver would have to "fight the wheel" to straighten out.

The correct amount of under-gather, fore-gather and castor, of course, varies with each make of vehicle so that in order to keep them as they should be, the correct measurement for the particular truck must be known.

On trucks, the correct amount of under-gather is $2\frac{3}{32}$ in. By this is meant that the wheels are $2\frac{3}{32}$ in. closer together at the bottom than at the top, measured at the wheel rim, not the tire rim. This is correct only for 36-in. solid tires. For other sizes the difference in the measurement should be as follows: 32-in. solid or cushion, $1\frac{13}{16}$ in.; solid or cushion, $1\frac{31}{64}$ in.; 32-in. pneumatic, $1\frac{3}{32}$ in.; 34-in. pneumatic, $1\frac{13}{32}$ in.; 36-38-40 in. pneumatic, $1\frac{37}{64}$ in.

There is no adjustment for under-gather, as this is obtained by the manner in which the knuckles themselves are machined. These knuckle forgings are so exceedingly stiff that it is unlikely that they will ever become bent. The only things which can change the under-gather, therefore, are wear or faulty adjustment of the wheel bearings, wear of the steering knuckle pin bushings, or rarely, a sprung axle center. Straightening the axle center is the obvious remedy, but it should be heated at the center only, and not more than to a blood-red heat, and then straightened in a press until the steering knuckle pins are parallel. It should then be cooled in oil.

Fore-gather is obtained by the adjustment of the tie rod. The latter is a straight tube running across the front of the axle, having ball sockets screwed on each end. One of these ball sockets may be removed with the ball from the steering arm and adjusted by loosening the two clamp bolts and screwing the ball retainer in or out.

The measurements controlling this adjustment are taken between the flanges of the rim at the extreme front and rear of the wheels. On Mack trucks with 36-in. solid or cushion tires, the difference between these measurements should be $\frac{3}{8}$ in. For other tire equipment the difference in measurement should be: 32-in. solid or cushion, $\frac{21}{64}$ in.; 34-in. solid or cushion, $\frac{23}{64}$ in.; 32-in. pneumatic, $\frac{15}{64}$ in.; 34-46-38-40 in. pneumatic, $\frac{5}{32}$ in.

AGE MAKES ADJUSTMENTS NECESSARY

The amount of castor or axle tilt depends upon two considerations, the mounting of the spring on the axle, and the shape and position of the spring itself. A wedge-shaped saddle is inserted between the spring and the spring pad on the axle, and in addition the front spring is mounted on the frame so that its front end is higher than its rear. Sometimes after long and continuous use the spring becomes somewhat distorted from its original form, though still capable of doing its work. In this case, the castor may be affected.

To determine the amount of castor a plumb line should be dropped from the lower edge of the front of the steering knuckle to the floor and the spot marked. A straight edge should then be laid along the steering knuckle, so that it bears on the upper and lower barrels and back of the lip of the central shroud. It should touch the floor $\frac{1}{16}$ in. ahead of the spot previously marked on the floor. The amount of castor can be varied by shimming either end of the spring seat.

Too much castor makes turning more difficult, since the front of the truck is actually lifted when the wheels are turned. With correct castor the maximum amount of lift will be 0.017 in.

A. H. LEIPERT,
Service Manager.
International Motor Co.

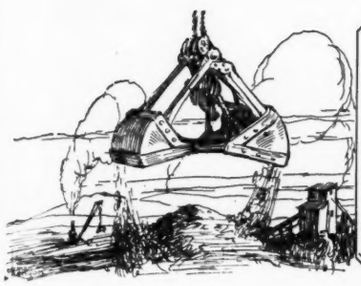
Automatic Brush Sweeps Dust From Pan Conveyor

Finely divided particles of coal that cling to the flights of a pan conveyor should be removed concurrently with the formation of the deposit. Otherwise, if the conveyor is in a slope, the accumulation becomes so heavy that it soon breaks off in large greasy lumps and falls into the conveyor pit at the bottom of the incline or is deposited on the floor along the entire length of the conveyor. As several tons of this fine sized slack will be thus scattered in one day by a conveyor having a capacity of say 300 tons an hour, clean-ups become imperative. The job cannot be performed economically or entirely satisfactorily by a man with a broom and a shovel because the surfaces on which the dust is deposited are not readily accessible. Consequently, much time is consumed in gathering the dust by this manual method.

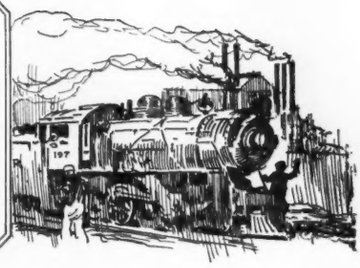
Dust Collector on Pan Conveyor

This device consists of a brush held in contact with the return flights of a pan conveyor under the tension of two springs thus sweeping to the ground the coal dust that accumulates.

At the slope mouth of the No. 14 mine of the Island Creek Coal Co., Holden, W. Va., an automatic brush device is rigged up that sweeps from the pans the dust that accumulates during each round of the conveyor. The device is simple and easily installed. A brush, as long as the conveyor is wide, is attached to two fulcrum bars and held in contact with the return strand of the conveyor by two tension springs as shown in the accompanying illustration.



Production And the Market



Soft Coal Market Shows Increased Irregularity But Trend Continues Upward

The bituminous coal market in general is holding its own quite well, though the gains are strikingly uneven; in fact there have been recessions here and there—probably only temporary in most instances. The New England trade continues to show marked strength, with prices headed upward. Unseasonably mild weather in most other sections of the country, however, has had a tendency to take the edge off demand, causing a return in some cases of the hand-to-mouth policy of buying. Western Kentucky is a notable case in point, the brisk spell having tapered off to such an extent that distress coal is now in evidence there. As so often happens, the first quickening in demand proved so tempting to many hungry for business that there has been an overproduction in some fields, which with warm weather caused the inevitable setback.

Trade Barometers Encouraging

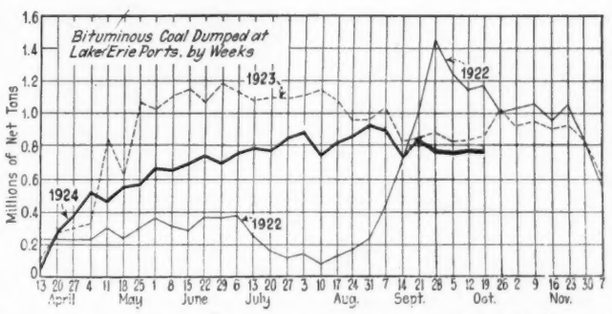
Such barometers of trade as car loadings continue to give encouragement regarding general business conditions, despite the prominent part played by grain loading in the weekly reports. Equipment buying by the railroads also continues apace, orders for 1,900 freight cars having been placed by the carriers during the third week of October.

Coal Age Index of spot prices of bituminous coal again advanced last week—for the seventh consecutive time—standing on Oct. 20 at 176, the corresponding price for which is $2.12. This compares with 174 and $2.10 respectively on Oct. 13.

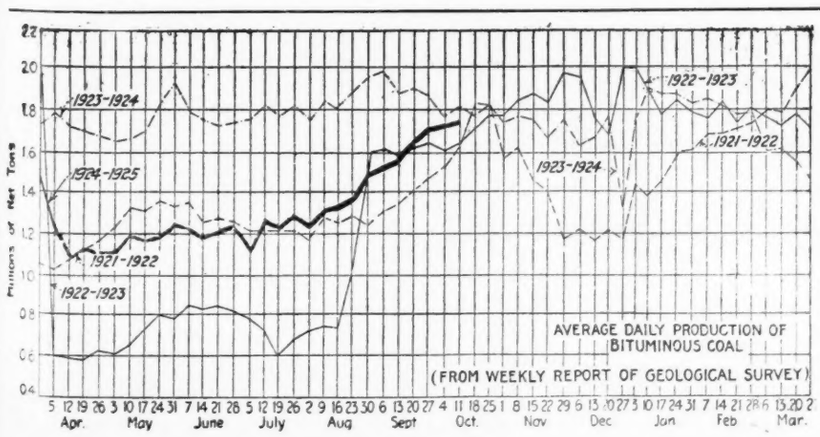
There was a slight reaction in activity at Hampton Roads last week, dumpings of coal for all accounts during the seven-day period ended Oct. 16 totaling 326,124 net tons, compared with 340,447 tons handled during the preceding week.

Coal continues to move up the lakes in steady volume, despite the many predictions that it would begin to fade out by this time. Dumpings at Lake Erie ports during the week ended Oct. 19, according to the Ore & Coal Exchange, were as follows: For cargo, 735,770 net tons; for fuel, 40,787 tons, compared with 737,102 and 40,547 tons respectively during the preceding week.

Bituminous coal output continues to increase slowly, production during the week ended Oct. 11, according to the Geological Survey, totaling 10,548,000 net tons, a gain of 273,000 tons over the week ended Oct. 4, when 10,275,000 tons was produced, according to revised figures. The rate of output now is not far behind that of 1923, though it is still far below that of 1920. Anthracite production rebounded sharply during the week ended Oct. 11, when 1,737,000 net tons was the total compared with 1,425,000 tons during the preceding week.



Producers are moving anthracite without much difficulty, but retailers still feel, despite a slow, steady gain, that business is not all that it should be. Stove is in steady demand, with chestnut a close second. Egg is lagging somewhat and pea is rather hard to move. Steam coals are holding their own fairly well. Independent prices are firm. Most of the mines flooded by the recent heavy rains are resuming production, only a few having failed to get under way.



Estimates of Production

(Net Tons)

	1923	1924
BITUMINOUS		
Sept. 27	11,347,000	10,140,000
Oct. 4 (*a*)	10,699,000	10,275,000
Oct. 11 (*b*)	10,953,000	10,548,000
Daily average	1,826,000	1,758,000
Cal. yr. to date (*c*)	432,665,000	352,896,000
Daily av. to date	1,799,000	1,463,000
ANTHRACITE		
Sept. 27	1,959,000	1,942,000
Oct. 4	1,949,000	1,425,000
Oct. 11	1,943,000	1,737,000
Cal. yr. to date	73,514,000	71,013,000
COKE		
Oct. 4	312,000	138,000
Oct. 11	284,000	129,000
Cal. yr. to date (*c*)	15,047,000	7,726,000

(*a*) Revised since last report. (*b*) Subject to revision. (*c*) Minus one day's production to equalize number of days in the two years.

Midwest Market Is Slower

The continued warm weather throughout the entire Middle West has shown its effect on every size from every field, although Franklin, Williamson and Saline counties in Illinois still are far behind on lump orders, which is due to short running time. No new business has presented itself. Domestic egg and nut sizes are somewhat easier with a tendency to cut prices. There is still a good deal of "no-bill" coal. Operators in this field will cut prices on their surplus only where they feel it will not harm them, storing the coal rather than slashing prices.

Screenings will bring only what the buyer is willing to pay. Where the larger mines are holding firm at $1.40@$1.50 for 1¼ in. and 2 in. screenings, respectively, off-grades move at $1@$1.25. Central Illinois fields are working more regularly than in southern Illinois, holding the price on 6 in. lump to $3, selling other sizes at the best price obtainable.

Indiana Fourth Vein is fairly firm; mines ore not operating steadily and there seems to be a demand for about what is offered for sale. Fifth Vein operators are having some difficulty in moving tonnage. Indiana screenings prices are from 80c. on Fifth Vein to $1.25 on Fourth Vein.

Western Kentucky is much easier to obtain; operators are accepting orders and ship them promptly at from 10c. to 25c. off the list price on domestic sizes. Their screenings are obtainable at 70c.@$1. Pocahontas screened lump and egg cannot be had lower than $4.50@$4.75. Old line companies' mine run is holding firm at $2@$2.25, but considerable good quality Pocahontas and New River mine run from independent operators is offered through jobbers at $1.50.

There has been a slight let-up in the demand for domestic coal on account of the warm weather in southern Illinois. Lump and egg are holding up well but nut and the other sizes are a drug on the market. Steam coal is unusually slow and a number of mines are storing it. Many mines are unable to work full time because of unbilled coal and other mines are unable to start up because of no market for these sizes. Prices are unchanged, however. Railroad tonnage continues fair. Car supply is good. Mines are averaging three to four days a week.

In the Duquoin and Jackson County fields domestic conditions are good. Mines are getting three days a week, but are unable to sell steam sizes. The Mt. Olive district shows greater activity than elsewhere considering its dormant condition for the last six months. There is good movement for domestic and railroad coal and steam seems to be moving better here than in any other field. Mines are getting four and five days a week. Conditions are still bad in the Standard field, many mines selling coal below cost on account of the steam market, and nearly all of them have unbilled coal on hand all the time.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	Oct. 22 1923	Oct. 6 1924	Oct. 13 1924	Oct. 20 1924†
Smokeless lump	Columbus	$6.35	$4.35	$4.35	**$4.35@$4.65**
Smokeless mine run	Columbus	3.05	2.20	2.20	**2.25@ 2.50**
Smokeless screenings	Columbus	1.35	1.20	1.20	**1.25@ 1.35**
Smokeless lump	Chicago	6.10	3.85	3.85	**4.50@ 4.75**
Smokeless mine run	Chicago	2.85	1.90	1.90	**1.75@ 2.25**
Smokeless lump	Cincinnati	5.85	4.10	3.85	**4.00@ 4.75**
Smokeless mine run	Cincinnati	2.50	2.25	2.35	*2.00@ 2.25*
Smokeless screenings	Cincinnati	1.75	1.15	1.30	*1.10@ 1.25*
*Smokeless mine run	Boston	4.55	4.25	4.30	**4.35@ 4.50**
Clearfield mine run	Boston	1.95	1.90	1.90	**1.65@ 2.50**
Cambria mine run	Boston	2.50	2.25	2.30	**2.35@ 2.85**
Somerset mine run	Boston	2.25	2.05	2.05	*1.75@ 2.35*
Pool 1 (Navy Standard)	New York	3.05	2.75	2.75	2.50@ 3.00
Pool 1 (Navy Standard)	Philadelphia	3.15	2.70	2.70	2.50@ 2.90
Pool 1 (Navy Standard)	Baltimore	....	2.60	2.60	**2.40@ 2.85**
Pool 9 (Super. Low Vol.)	New York	2.35	2.10	2.10	2.00@ 2.25
Pool 9 (Super. Low Vol.)	Philadelphia	2.45	2.15	2.15	1.95@ 2.35
Pool 9 (Super. Low Vol.)	Baltimore	2.15	1.85	1.85	**1.85@ 1.95**
Pool 10 (H.Gr. Low Vol.)	New York	2.05	1.90	1.90	1.80@ 2.00
Pool 10 (H.Gr. Low Vol.)	Philadelphia	2.00	1.75	1.75	1.65@ 1.90
Pool 10 (H.Gr.Low Vol.)	Baltimore	2.10	1.65	1.65	**1.65@ 1.75**
Pool 11 (Low Vol.)	New York	1.85	1.60	1.60	1.50@ 1.75
Pool 11 (Low Vol.)	Philadelphia	1.70	1.45	1.45	1.35@ 1.60
Pool 11 (Low Vol.)	Baltimore	1.90	1.55	1.55	**1.55@ 1.65**
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.60	1.55	1.55	1.50@ 1.65
Pool 54-64 (Gas and St.)	Philadelphia	1.60	1.50	1.50	1.40@ 1.60
Pool 54-64 (Gas and St.)	Baltimore	1.75	1.40	1.40	**1.45@ 1.55**
Pittsburgh scr'd gas	Pittsburgh	2.55	2.40	2.40	2.30@ 2.50
Pittsburgh gas mine run	Pittsburgh	2.25	2.10	2.10	2.00@ 2.25
Pittsburgh mine run (St.)	Pittsburgh	1.85	1.85	1.85	1.75@ 2.00
Pittsburgh slack (Gas)	Pittsburgh	1.20	1.25	1.25	*1.15@ 1.25*
Kanawha lump	Columbus	3.15	2.10	2.10	**2.35@ 2.75**
Kanawha mine run	Columbus	1.85	1.40	1.40	**1.35@ 1.65**
Kanawha screenings	Columbus	.90	.95	.90	**.90@ 1.10**
W. Va. lump	Cincinnati	3.50	2.60	3.25	*2.75@ 3.50*
W. Va. gas mine run	Cincinnati	1.60	1.50	1.50	1.40@ 1.65
W. Va. steam mine run	Cincinnati	1.60	1.40	1.40	*1.25@ 1.50*
W. Va. screenings	Cincinnati	1.00	.95	1.00	*.90@ 1.00*
Hocking lump	Columbus	3.05	2.50	2.50	**2.40@ 2.70**
Hocking mine run	Columbus	1.85	1.60	1.60	*1.50@ 1.65*
Hocking screenings	Columbus	.90	.95	.90	*.80@ .90*
Pitts. No. 8 lump	Cleveland	2.60	2.35	2.35	**2.00@ 2.80**
Pitts. No. 8 mine run	Cleveland	1.85	1.85	1.85	1.85@ 1.90
Pitts. No. 8 screenings	Cleveland	1.00	1.15	1.05	1.00@ 1.15

Midwest	Market Quoted	Oct. 22 1923	Oct. 6 1924	Oct. 13 1924	Oct. 20 1924†
Franklin, Ill. lump	Chicago	$4.10	$3.35	$3.35	$3.25@$3.50
Franklin, Ill. mine run	Chicago	2.60	2.35	2.35	2.25@ 2.50
Franklin, Ill. screenings	Chicago	1.45	1.35	1.35	1.25@ 1.50
Central, Ill. lump	Chicago	3.10	2.85	2.85	2.75@ 3.00
Central, Ill. mine run	Chicago	2.10	2.20	2.20	2.15@ 2.25
Central, Ill. screenings	Chicago	.90	1.15	1.15	1.10@ 1.25
Ind. 4th Vein lump	Chicago	3.35	3.10	3.10	3.00@ 3.25
Ind. 4th Vein mine run	Chicago	2.60	2.35	2.35	2.25@ 2.50
Ind. 4th Vein screenings	Chicago	1.20	1.35	1.35	*1.25@ 1.35*
Ind. 5th Vein lump	Chicago	2.50	2.85	2.85	2.75@ 3.00
Ind. 5th Vein mine run	Chicago	2.10	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	.80	1.25	1.25	*.80@ 1.10*
Mt. Olive lump	St. Louis	3.10	2.85	2.85	2.75@ 3.00
Mt. Olive mine run	St. Louis	2.25	2.50	2.50	2.50
Mt. Olive screenings	St. Louis	1.25	1.25	1.25	**1.35**
Standard lump	St. Louis	3.10	2.85	2.85	2.75@ 3.00
Standard mine run	St. Louis	2.05	1.80	1.80	**2.00@ 2.40**
Standard screenings	St. Louis	.50	.80	.80	.75@ .90
West Ky. lump	Louisville	2.40	3.35	3.85	*3.25@ 3.50*
West Ky. mine run	Louisville	1.65	1.70	1.70	1.50@ 1.90
West Ky. screenings	Louisville	.50	.80	.80	*.60@ .80*
West Ky. lump	Chicago	2.60	2.85	2.85	*2.50@ 3.00*
West Ky. mine run	Chicago	1.75	1.65	1.65	1.35@ 1.95
South and Southwest					
Big Seam lump	Birmingham	3.75	3.00	3.00	2.75@ 3.25
Big Seam mine run	Birmingham	1.95	1.60	1.60	1.50@ 1.75
Big Seam (washed)	Birmingham	2.35	1.85	1.85	1.75@ 2.00
S. E. Ky. lump	Chicago	3.00	3.10	3.10	*2.75@ 3.00*
S. E. Ky. mine run	Chicago	2.25	1.60	1.60	1.50@ 1.75
S. E. Ky. lump	Louisville	3.00	3.10	3.60	*3.25@ 3.50*
S. E. Ky. mine run	Louisville	1.75	1.60	1.55	**1.50@ 1.75**
S. E. Ky. screenings	Louisville	.80	.90	.90	**.85@ 1.05**
S. E. Ky. lump	Cincinnati	3.55	2.75	3.35	3.00@ 3.75
S. E. Ky. mine run	Cincinnati	1.55	1.55	1.55	1.35@ 1.75
S. E. Ky. screenings	Cincinnati	.90	1.00	1.00	*.90@ 1.10*
Kansas lump	Kansas City	5.00	5.00	5.00	5.00
Kansas mine run	Kansas City	3.50	3.25	3.25	**3.50**
Kansas screenings	Kansas City	2.25	2.35	2.35	*2.00*

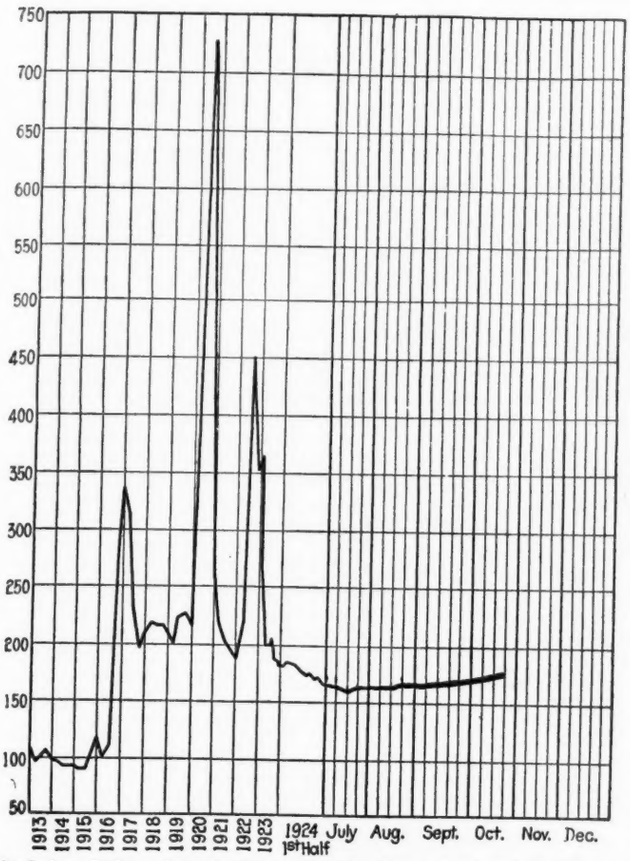
* Gross tons, f.o.b. vessel, Hampton Roads

† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Oct. 22, 1923 Independent	Oct. 22, 1923 Company	Oct. 13, 1924 Independent	Oct. 13, 1924 Company	Oct. 20, 1924† Independent	Oct. 20, 1924† Company
Broken	New York	$2.34	$9.60	$8.00@$9.25	.....	$8.00@$9.25	.....	$8.00@$9.25
Broken	Philadelphia	2.39	.....	.....	.....	9.15	.....	9.15
Egg	New York	2.34	9.85@12.25	8.75@ 9.25	$9.25@$9.75	8.75@ 9.25	$9.25@$9.75	8.75@ 9.25
Egg	Philadelphia	2.39	9.85@12.20	8.75@ 9.25	9.25@ 9.75	8.80@ 9.25	9.25@ 9.75	8.80@ 9.25
Egg	Chicago*	5.06	9.60@12.50	8.00@ 8.35	8.17@ 8.27	8.14@ 8.20	8.17@ 8.27	8.14@ 8.20
Stove	New York	2.34	9.85@12.25	8.75@ 9.25	10.00@10.50	8.75@ 9.50	10.00@10.50	8.75@ 9.50
Stove	Philadelphia	2.39	9.85@12.20	8.90@ 9.25	9.85@10.25	9.15@ 9.50	9.85@10.25	9.15@ 9.50
Stove	Chicago*	5.06	9.60@12.50	8.00@ 8.35	8.63@ 8.75	8.50@ 8.64	8.63@ 8.75	8.50@ 8.64
Chestnut	New York	2.34	9.85@12.25	8.75@ 9.25	9.50@10.00	8.75@ 9.25	**9.50@10.25**	8.75@ 9.25
Chestnut	Philadelphia	2.39	9.85@12.20	8.90@ 9.25	9.65@10.00	9.15@ 9.25	9.65@10.00	9.15@ 9.25
Chestnut	Chicago*	5.06	9.60@12.50	8.00@ 8.35	8.26@ 8.40	8.44@ 8.60	8.26@ 8.40	8.44@ 8.60
Pea	New York	2.22	6.75@ 8.25	6.15@ 6.65	5.25@ 5.50	5.50@ 6.00	5.25@ 5.50	5.50@ 6.00
Pea	Philadelphia	2.14	6.75@ 9.00	6.35@ 6.60	5.75@ 6.35	5.75@ 6.00	5.75@ 6.35	5.75@ 6.00
Pea	Chicago*	4.79	6.00@ 6.75	5.40@ 6.05	5.13@ 5.45	5.36@ 6.20	5.13@ 5.45	5.36@ 6.20
Buckwheat No. 1	New York	2.22	2.50@ 3.50	3.50	2.25@ 3.00	3.00@ 3.15	2.25@ 2.75	3.00@ 3.15
Buckwheat No. 1	Philadelphia	2.14	3.00@ 3.50	3.50	2.50@ 3.00	3.00	2.50@ 3.00	3.00
Rice	New York	2.22	1.85@ 2.50	2.50	1.85@ 2.25	2.00@ 2.25	*1.80@ 2.00*	2.00@ 2.25
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.00@ 2.25	2.25	2.00@ 2.25	2.25
Barley	New York	2.22	1.15@ 1.50	1.50	1.25@ 1.50	1.50	1.25@ 1.50	1.50
Barley	Philadelphia	2.14	1.25@ 1.50	1.50	1.50	1.50	1.50	1.50
Birdseye	New York	2.22	.....	1.60	1.35@ 1.60	1.60	1.35@ 1.60	1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index of Spot Prices of Bituminous Coal F.O.B. Mines

	1924			1923
	Oct. 20	Oct. 13	Oct. 6	Oct. 22
Index	176	174	171	186
Weighted average price	$2.12	$2.10	$2.07	$2.25

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States, weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke; 1913-1918," published by the Geological Survey and the War Industries Board.

Mild weather has enabled St. Louis dealers to begin to get caught up. Business is good and coal is plentiful and nearly all dealers have a good supply on hand. Wagonload steam is picking up, but carload steam is still slow. Country domestic conditions show improvement for the better grades of coal, but country steam is slow with no change in prices. Domestic demand is principally for higher grade coal.

Kentucky Prices Weaken

Prices quoted on all coals mined in Kentucky are weaker this week than last week, due to unusually fine October weather, low consumption, heavy production, lack of interest by consumers and the fact that operators tried to ride the market up too fast when demand was good and they were a bit oversold. The high prices put out on future delivery quotations killed demand, and when orders in hand were filled operators had to accept lower priced business in order to keep running.

In eastern Kentucky screenings have held quite well, in spite of heavy production, and prices are 85c.@$1.05, but with very little tonnage over 95c. In western Kentucky the market has broken, as Illinois, Indiana and other fields have been offering cheap screenings, and forced the market, until some western Kentucky distressed stuff is said to be quoted as low as 50c.

The eastern and western Kentucky markets are closer together on quotations than for a long time.

Eastern Kentucky is running well, with very little car shortage reported, and a number of mines that have been idle are on the producing lists. It is claimed that the Hazard field probably will break production records in October, and the Harlan district also is producing a fine volume.

Northwest Trade Sags

Official reports of stocks on Duluth docks Oct. 1 as given by the U. S. Engineer's office show less coal than on Sept. 15. This is due to the fact that dealers are stocking up and also because anthracite has been moving to some extent. The soft is 4,656,000 tons, of which 2,100,000 is free, and the hard is 610,400 tons. Shipments, however, are picking up. Thirty-six cargoes arrived last week, of which four were hard coal, and fourteen are en route, of which three are hard.

The feature of the market at the Head-of-the-Lakes is the heavy demand for Pocahontas lump, which is now selling at $8, with every possibility of another 50c. jump at the first of the month. There is no change in run of pile or screenings. The accumulation of Pocahontas screenings is getting beyond a joke. Prices are unchanged on all coals. Industrial demand is at a standstill. The iron ranges are practically closed down waiting for the election results.

Anthracite has slacked off in the past week, but the stocks on docks were reduced nearly 60,000 tons in the last fifteen days before the first of the month. There will be no shortage of hard coal at Duluth-Superior.

Mild autumn weather has made the coal trade of Milwaukee a waiting game. Consumers are holding back until lower temperatures compel them to fill their bins, and dealers are waiting for the consumers. The pressure for Pocahontas has eased somewhat because of the recent advance in the face of prevalent mildness. Coal continues to come in freely by lake. Thus far in October Milwaukee has received 50,807 tons of anthracite and 159,007 tons of bituminous coal.

West Is Fairly Busy

Warm weather and less demand have enabled operators, some of them as much as a month behind on orders for domestic grades, to catch up with their orders. A further cut in the price of screenings in all the Southwestern fields has reduced the surplus of this grade. Kansas screenings dropped 35c. down to $2, Arkansas screenings from the circular price of $2 to $1.50 and Henryetta (Okla) screenings, which have been $2, are now $1.50@$1.75. There have been no other price changes.

A more favorable week was experienced in Colorado last week due to the growing demand for domestic coals. Mines averaged thirty-one hours last week with less than 20 per cent of the working time lost attributed to "no market." A number of operators are booked ahead for thirty days.

In Utah intermediate sizes and slack are moving easier. Mining and smelting companies and the railroads are the best industrial customers now. Prices are more settled than for a long time. Even the expected advance in the retail market is not likely to materialize.

Mild Weather "Settles" Ohio Markets

The Cincinnati market has "settled" a little in the past week, more through the effect of the weather than a stoppage of buying orders. There is still a cry of shortage of equipment from the southeastern Kentucky and West Virginia fields, due mostly to the fact that numerous mines which have not worked for weeks or months are starting up. The movement continues at the peak with occasional reports that dealers have suspended or cancelled orders, due to the fact that there has come quite a spread once more between the asked price and "spot" prices.

A marked slackening in domestic orders at Columbus, due to mild weather, has permitted producers and shippers to get cleaned up and the market is now in a waiting attitude. Prices on a retail basis are still strong at the higher levels which have prevailed. Smokeless grades and splints are still in a fair demand, but southern Ohio business has fallen off. The expected increase in steam business has failed to materialize and the trade is waiting to see what happens. Contracting is quiet, and cheap coals, mostly demurrage cargoes, are often sold at bargains. Screenings are still very weak. Lake trade is going along as usual for the lateness of the season.

Moderate temperatures in eastern Ohio have done considerable to dampen the steam as well as the domestic trade, which has been especially active. Steam buying is on a hand-to-mouth basis, and requirements are more or less at a minimum, because industrial operations have not gotten back to normal by any means. There is no change in spot prices, which are holding firm and are not expected to recede because producers are limiting operations to ship-

ments on coal already sold, and little distress coal is reported.

Big output, low prices made from beyond the Pennsylvania line and mild weather are conspiring to prolong the slack condition of the Buffalo market, which approaching winter is not able to counteract. It is time, by the calendar, for demand to rise rapidly and the smaller stocks from those of the early part of the year also warrant such a stir, but consumption does not seem to warrant it. Demand is quiet and prices are weak.

Owing to the prolonged spell of mild weather the demand at Toronto is rather slack with prices as follows: Pennsylvania smokeless, $5.85; steam lump, $6.25@$6.75; slack, $5.70. Anthracite is $15.50, and supplies are plentiful.

Pittsburgh Has Competitive Market

The Pittsburgh market is in a highly competitive position with too much production, the buying having fallen off. Operation has been at a 50 per cent level since the middle of September. Domestic coal is moving in fair volume, at former prices. A number of producers are pursuing the policy of not soliciting business, hoping that thereby the market will work upward to a reasonable level.

Demand Picking Up in New England

For really high-grade run of mine New River and Pocahontas $5.50 gross ton on cars Boston is now the general asking price for prompt and nearby shipments; business was closed during the week for shipments a fortnight hence at $5.65. Prices have strengthened noticeably in the Providence market, no first quality steam coal being offered now under $5.40 on cars and $5.50 being asked not infrequently.

Local shippers who purchased pool 1 run of mine New River and Pocahontas early in the week at $4.35 gross ton f.o.b. Hampton Roads are now unable to obtain anything under $4.40, and even at this offerings are light. For the choicer coals $4.50 is firmly quoted. Tonnage purchased at the former level of prices for New England shipments is now well cleaned up and shippers here are forecasting $6 coal in New England before the year is out.

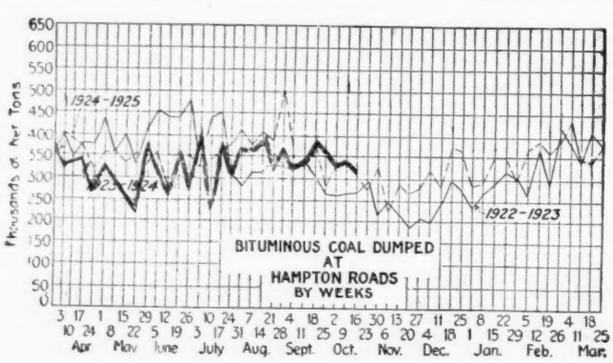
Demand is increasing considerably, particularly at Boston, and inquiries are becoming quite numerous. Both sales and inquiries involve some substantial blocks for spot, next sixty days and through to April 1. One sale of 10,000 tons of New River has been closed for shipments to April.

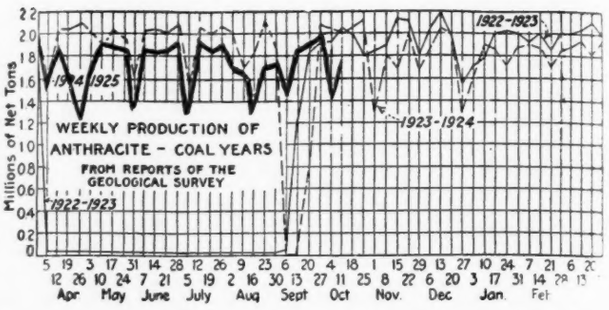
No worthwhile expansion is noted in all-rail coal but prices are a bit firmer, tonnage that has been offering at $2 net ton mines being generally quoted $2.10@$2.15, so the landed cost still favors coal from tide.

Atlantic Markets Improve Slightly

No considerable improvement is reflected in the New York market nor can it be said that the situation is any quieter than it was last week. Line trade shows no increased activity, but the situation at tidewater has changed somewhat because of heavier shipments. Most of the coal sent here has been on contract and a little extra demand has practically cleared up the free coals. This has happened a few times recently, causing a slight price advance.

In the matter of tonnage the Philadelphia market is improving but prices continue on the old level. More coal is moving on contracts and prices for this business are considerably above spot quotations. Last week one of the utility plants in the city closed for 1,000,000 tons, divided among two producers. Everyone is hopeful that after election business will go forward much more rapidly. There


Thousands of Net Tons
1924-1925
1923-1924
1922-1923
BITUMINOUS COAL DUMPED AT HAMPTON ROADS BY WEEKS
Apr May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar.


Millions of Net Tons
1922-1923
1924-1925
1923-1924
WEEKLY PRODUCTION OF ANTHRACITE - COAL YEARS
FROM REPORTS OF THE GEOLOGICAL SURVEY
Apr May June July Aug Sept Oct Nov. Dec Jan. Feb

are very light holdings of coal at tide, and very few charters recorded recently.

The tide has turned at Baltimore in home trading for bituminous coal. There is no shortage of fuel, but purchasers are not quibbling when holders of better grade fuels ask 10c. to 20c. in advance of the recognized average prices of a few weeks ago. Despite the fact that the first 17 days of October have fallen behind the same period of September in coal exports there is an air of expectancy in shipping circles that is encouraging.

At Birmingham all grades of coal are suffering because of comparatively light demand. The weather is very dry and surplus domestic coal is moved with some difficulty. Prices are pretty well stabilized, with no likelihood of lower levels through the balance of the year. With the advent of cold weather both domestic and steam demand are expected to improve greatly. Production has risen materially.

Anthracite Output Picks Up

From the viewpoint of the producer and shipper the anthracite market at New York is about all that could be expected so far as demand goes, but retail business is comparatively quiet. To induce buying while it is possible to get coal and avoid transportation troubles the aid of city officials has been solicited and appeals have been issued to consumers. Coal from the mines is easily moved. There is an urgent demand for stove with chestnut a close second. Egg is not so easily moved unless it is taken with stove, but it is not accumulating. Independent quotations for stove in straight lots are reported as high as $11 but the average maximum is 50c. lower, and when taken with egg or chestnut sizes is quoted still lower. Pea is easy and in some instances hard to move alone. Demand for steam coals is steady, but prices, except for barley, are generally below company schedule.

Demand at Philadelphia is moderate because of the mild weather. Stove remains the only really active size, but chestnut is improving. Pea is moving slowly, even with curtailed production. There is only slight demand for egg, which seems to await colder weather. The retail trade is restive and the number of dealers cutting prices has increased. Steam coals are slow, and the only improvement is due to curtailed production. The mines are gradually resuming production after the flood, until at this time there are only a few that have not mined some coal.

At Baltimore the demand for hard coal continues to increase with the cooler weather. Most dealers have sufficient supplies on hand to meet this demand, except that some are short of stove coal. Many householders who have open fireplaces and who have been in the habit of burning logs until real cold weather sets in apparently intend to burn coal from the outset of cooler weather.

Trade at Buffalo is better than it was, but sunny weather has held back really brisk business. Sellers are somewhat uneasy, fearing car shortage and that supply will run below demand. The shippers who contracted to furnish the city schools most of their fuel in the form of Pennsylvania smokeless coal report that it is giving full satisfaction.

Car Loadings, Surplusages and Shortages

	Cars Loaded — All Cars	Cars Loaded — Coal Cars
Week ended Oct. 4, 1924	1,077,006	186,516
Previous week	1,087,447	193,422
Week ended Oct. 6, 1923	1,079,690	191,741

	Surplus Cars — All Cars	Surplus Cars — Coal Cars	Car Shortage	
Oct. 7, 1924	103,730	52,643	.....	.....
Sept. 30, 1924	116,689	58,375	.....	.....
Oct. 7, 1923	34,138	7,098	16,160	4,600

Foreign Market And Export News

Foreign Demand Gains in British Market; Prices Fairly Steady

With the exception of semi-anthracite, the demand in the Welsh coal market shows scarcely any improvement. Foreign demand is somewhat better with French and Argentine railways inquiring for larger quantities. Foreign bunkering depots also are taking heavier supplies. Some collieries where stoppage notices expired are now continuing operations from day to day.

There is an abundance of coal on hand, but operators have declared that they have gone to the limit in price concessions; in these circumstances prices have remained fairly steady. The position in the European coal markets makes business with France very difficult, while there is no trade with Belgium, owing to the industrial situation in that country. There is an almost total absence of inquiry from Holland and Germany. The rise in freights to South America has been a setback.

Operators in the north of England also have refused to make any further concessions in prices, so that the Newcastle market is given an appearance of firmness. There is very little trade at all; pits are still closing down, and nearly all of the rest are operating on short time.

Output by British collieries during the week ended Oct. 4, a cable to *Coal Age* states, was 5,155,000 tons, according to the official reports. This compares with 5,208,000 tons produced during the previous week.

Business at Hampton Roads Develops Strong Tone

The Hampton Roads market was considerably stronger this week due to shortage at the piers and a strong demand for bunkers, together with a pick-up in coastwise trade. Foreign business has shrunk, with little in sight.

Domestic business is weaker, on account of unusually mild weather. High-volatile coal is less in demand, and its price was not changed during the week, the other pools going up materially. Business in pools 1 and 2 was brisk and the piers were busy. Accumulations at tidewater were reduced materially through rail shipments to the west direct from mines, and stronger prices were more attributable to this than to any extra demand.

French Industrial and House Coals More Active

While the situation in the French coal market shows no general improvement, orders for industrial coals have been coming in steadily since prices for October were established. The railways show hesitancy in buying French coals, the prices of which are considered too high in comparison with those of Germany and the United Kingdom. Demand is generally weak, with stocks about normal.

For house coals the demand is more active, but shipments are delayed through the rolling stock position. Deliveries of house coal from Belgium are slow, apparently having been reduced for the purpose of selling at higher rates when opportunity presents itself. Arrivals from Germany on the open market are not important.

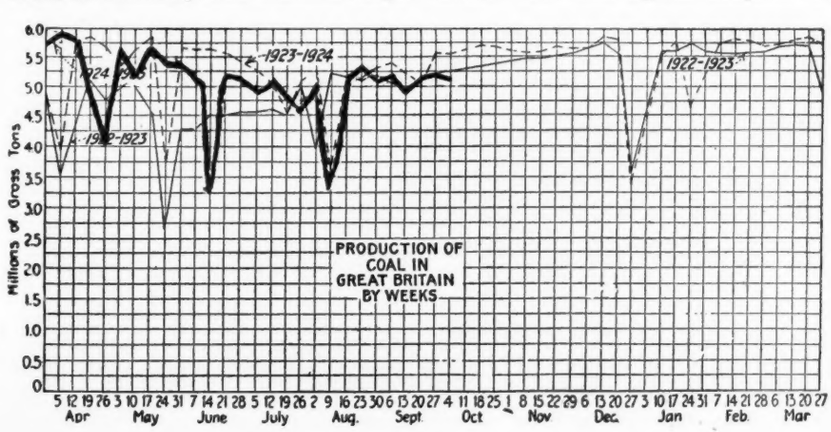
Rail traffic is somewhat congested, especially on the State Railway lines; canal freight is quiet but steady at 23f. Béthune-Paris; 9-9. 25f. Rouen-Paris.

Reparation deliveries from Sept. 1 to 29 amounted to 895,765 tons of fuels, including 432,472 tons of coal, 423,030 tons of coke and 36,263 tons of lignite briquets; or a daily average of 30,700 tons.

On Oct. 1 the prices of industrial fuels on trucks French frontier, trucks or canal barges, French ports of the Rhine, were lowered by 2.50f. per ton. House coal and lignite briquets are unchanged. Prices for oversea cargoes, via Rotterdam, Antwerp or Ghent, for French Channel, Atlantic or Mediterranean ports have been reduced 5f. per ton for unscreened 18-26 per cent volatile matter and washed steam peas. On trucks or canal barges, Antwerp or Ghent, prices are unaltered.

From Oct. 1 to 8, the O.R.C.A. received 77,693 tons of coke, a daily average of 9,700 tons. The price of reparation coke, unaltered thus far, probably will be changed soon.

The position of the Belgian coal market is critical and there are bitter complaints of severe competition. Borinage mine owners having refused to arbitrate, the strike continues and is even growing worse.



Export Clearances, Week Ended Oct. 18, 1924

FROM HAMPTON ROADS

	Tons
For Canada:	
Br. Schr. Burpee L. Tucker for St. John	743
Fr. Str. Emilie L. D. for Montreal	6,533
Dan. Str. Nordhavet for St. John	5,018
For Canal Zone:	
Amer. Str. Ulysses, for Cristobal	12,059
For West Indies:	
Fr. Str. Caid, for St. Pierre	1,173

FROM PHILADELPHIA

For Newfoundland:	
Nor. Str. Evviva for St. Johns	——

FROM BALTIMORE

For Canada:	
Nor. Str. Otta, for Corner Brook	4,592
For France:	
Belg. Str. Elzasier, for Dunkirk	7,538
For Chile:	
Br. Str. Denham, for Antofagasta (coke)	3,482

Hampton Roads Pier Situation

N. & W. Piers, Lamberts Pt.:	Oct. 9	Oct. 16
Cars on hand	1,128	825
Tons on hand	71,373	53,728
Tons dumped for week	115,089	111,860
Tonnage waiting	6,000	5,000
Virginian Piers, Sewalls Pt.:		
Cars on hand	1,210	1,118
Tons on hand	83,650	80,000
Tons dumped for week	106,433	105,729
Tonnage waiting	6,666	7,800
C. & O. Piers, Newport News:		
Cars on hand	1,176	1,596
Tons on hand	59,725	84,060
Tons dumped for week	82,449	74,486
Tonnage waiting	510	3,760

Pier and Bunker Prices, Gross Tons

PIERS

	Oct. 11	Oct. 18†
Pool 9, New York	$4.75@$5.05	**$4.80@$5.10**
Pool 10, New York	4.60@ 4.75	**4.65@ 4.80**
Pool 11, New York	4.35@ 4.50	4.35@ 4.50
Pool 9, Philadelphia	4.90@ 5.25	4.90@ 5.25
Pool 10, Philadelphia	4.45@ 4.70	4.45@ 4.70
Pool 11, Philadelphia	4.30@ 4.50	4.30@ 4.50
Pool 1, Hamp. Roads	4.25	**4.40@ 4.50**
Pool 2, Hamp. Roads	4.10@ 4.15	**4.20@ 4.30**
Pools 5-6-7 Hamp. Rds.	4.00@ 4.10	4.00@ 4.10

BUNKERS

Pool 9, New York	$5.00@$5.30	**$5.05@$5.35**
Pool 10, New York	4.85@ 5.00	**4.90@ 5.05**
Pool 11, New York	4.60@ 4.75	4.60@ 4.75
Pool 9, Philadelphia	4.90@ 5.25	4.90@ 5.25
Pool 10, Philadelphia	4.75@ 4.95	4.75@ 4.95
Pool 11, Philadelphia	4.50@ 4.70	4.50@ 4.70
Pool 1, Hamp. Roads	4.25	**4.50**
Pool 2, Hamp. Roads	4.10@ 4.15	**4.30**
Pools 5-6-7 Hamp. Rds.	4.00@ 4.10	**4.10**

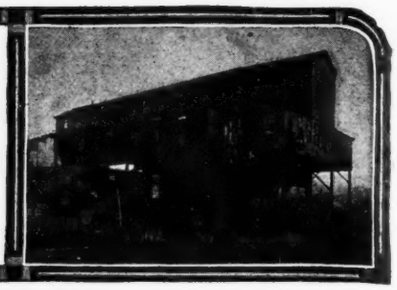
Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations by Cable to *Coal Age*

Cardiff:	Oct. 11	Oct. 18†
Admiralty, large	27s.@27s.6d.	*27s.*
Steam smalls	10s.@15s.	**11s.6d.@15s.6d**
Newcastle:		
Best steams	17s.9d.@18s.6d.	*17s.6d.@18s.*
Best gas	21s.@22s.6d.	**22s.6d.@26s.9d.**
Best bunkers	17s.6d.@18s.6d.	17s.6d.@18s.6d.

†Advances over previous week shown in **heavy type**, declines in *italics*.

News Items From Field and Trade



ALABAMA

The Munro-Warrior Coal Co. is considering the erection of a new tipple at its Nauvoo No. 2 mine, Walker County, and it is understood that plans for the structure are now being drawn. These mines are now operating on practically full time.

W. L. Smith and associates of Gadsden, are opening coal mines at Altoona which may soon be producing from 400 to 500 tons daily. They will turn out 200 tons at the start, it is stated, and the coal is of high quality. A tipple 65 ft. high is being completed and a spur track on the top of the mountain runs back to the opening, a distance of 2,300 ft. A new system of mining is being employed, which it is asserted will reduce the cost. The Underwood seam on the property is 4 ft. 6 in. thick. The Blue Gem seam also is to be worked.

Charles F. DeBardeleben, Jr., has been appointed general manager of the Alabama Fuel Co., with supervision over all properties, according to a recent announcement. Mr. DeBardeleben probably is the youngest man in the state to be given such a responsible position. His father is president of the company, which includes some of the largest and most active coal operations in the state. The new general manager, after coming from school, was sent to the Overton mine, where he was employed, and was later made superintendent of that plant.

Officials of the Sloss-Sheffield Steel & Iron Co. have practically completed negotiations for the purchase of the properties of the Alabama Company. The deal will give the Sloss-Sheffield company four furnaces in Etowah County and coal properties in Tuscaloosa County. Besides it will get possession of the Mary Lee mine near Birmingham, and of a small railroad which will enable the Sloss company to make connections between its furnaces and its coal mines. Use of this road is expected to save Sloss a substantial sum in freight charges annually. The price, including certain obligations to be assumed by the Sloss company, is approximately $4,000,000. There will be no public financing.

COLORADO

Ralph F. McKinley and Charles H. Cox, experienced in the Canon City and Crested Butte regions, have taken over the Butcherknife mine, 14 miles west of Steamboat Springs and expect to build a 2-mile branch from the Moffatt road to the mine. C. O. Rudisill, who has been operating the mine, has gone into the feed and fuel business in Steamboat Springs.

ILLINOIS

George A. Miller, who was Western manager of sales for the Sheridan Wyoming Coal Co., under Peabody Coal Co. management has been made general sales agent of the Peabody company with an office at the company's headquarters in Chicago. The contract for selling the Sheridan Wyoming Coal Co.'s output terminated Oct. 1.

Peabody, Houghteling & Co. are offering $2,250,000, 7 per cent cumulative preferred stock of the Peabody Coal Co., of Chicago. This stock, part of an issue of $4,425,000 already outstanding, was acquired by Peabody, Houghteling & Co. from certain of the stockholders at private sale and is offered at 100 and accrued dividend, to yield 7 per cent.

J. H. Evans, of St. Louis, has joined the clerical forces of the Old Ben Coal Corporation at Mine No. 12, near Christopher.

George Duncan, of Alton, was made permanent receiver for the St. Louis Coke & Iron Co., of Granite City, recently when the case was called for hearing before U. S. Judge Louis Fitzhenry at Springfield. Duncan was made temporary receiver a few weeks ago when a petition in bankruptcy was filed.

The Valier Coal Co., at Valier, broke its hoisting record recently by hoisting 7,072 tons of coal in eight hours. The output filled 125 railroad cars. The mine on that day averaged 1,000 tons per hour actual hoisting time.

Mine No. 5, at Pinckneyville, is the first Southern Gem Coal Corporation property to start operations since the general shutdown of the bankrupt company's mines late last December. The mine worked 5 days last week and prospects are good during the coming months for steady operation. While a full crew is not being employed, the larger portion of the former miners employed at the plant are again working.

KENTUCKY

The East Kentucky Coal Co., of Hazard, has increased its capital stock from $50,000 to $100,000.

It is reported that coal operators and shippers of the Kentucky district are generally opposing the Howell-Barkley transportation bill, up before the last Congress and to come up again soon, and a number of large organizations have adopted resolutions condemning this bill, and also the proposed twentieth amendment to the Constitution, which would prohibit any work, even home work or farm work, for any boy or girl under 18 years of age. The latter bill would aid union labor alone and be of no advantage except to aid union labor in getting a higher wage scale and work a hardship on parents.

T. L. Bell has been appointed general superintendent of the Kentucky mining operations of the Munro-Warrior Coal & Coke Co., with headquarters at Nortonville. Mr. Bell was formerly attached to the engineering department of the Tennessee Coal, Iron & Railroad Co.

An involuntary petition in bankruptcy was filed in the U. S. District Court at Covington Oct. 11 by the Mahan Co., the Powell-Hackney Co. and the Hazard Fruit Co. against the Blackey Coal Co. of Blackey, seeking to have the defendant company declared bankrupt. The creditors' claims aggregate $5,571.69.

R. C. Tway, head of the R. C. Tway Coal Co., Louisville, with mines in eastern Kentucky and retail yards in Louisville, has purchased at a reported price of $60,000, 100 ft. of Broadway property, in Louisville, for enlargement of the coal and building supply business now on adjoining property.

There were fifty causes for the 11,572 accidents in Kentucky's greatest industry, coal mining, from Aug. 1, 1923, to Aug. 1, 1924. Falling objects netted 4,034 mishaps. Being caught between objects caused 3,325. Falls of coal, slate and shale caused 1,974. Other causes, bringing the total accidents to 11,572 were: Emery particles, dust 538; handling heavy objects, 338; sharp edges, 292; miscellaneous or unclassified, 135; coupling cars, 121; slipping, 120; hot metals, 83; nails stepped on, dump and pit cars, 76; hit by vehicles, cars, etc., 63; motor or hand cars, 56; electricity, 54; falls from wagons, cars, etc., 32; hit by machine parts, 31; powder and dynamite explosions, 27; hit by hoisted objects, 27; animal kicks, bites, 23; stumbling, 15; collision of cars, 15; hot substances, 13; hit by chips, etc., 22; hand tools, 10.

NEW YORK

Justice Nichols of the New York Supreme Court has signed an order permanently restraining operations of the Cranston Coal Mining Corporation in New York State. Amos D. Moscrip, Deputy Attorney General, told the court that the firm's operations had cost residents of Wayne, Monroe and Genesee counties more than $100,000 when they

answered advertisements and purchased stock in the corporation to obtain coal from "their own mines." Purchasers were taken to the mining district near Carbondale, Pa., and coal mines represented as belonging to the company were shown to them. Investigation showed, Mr. Moscrip testified, that no coal had been produced in Pennsylvania by the firm. Officers of the corporation were named as Robert McLaughlin of New York, president; William M. Day, of Norfolk, Va., vice-president, and E. M. Saunders, of Philadelphia, secretary and treasurer.

OHIO

The Combined Coal Co., capitalized at $42,000 has been organized at Crooksville by sixteen miners. They have taken over the Cres Mar Coal Co.'s holdings, and plan to supply domestic coal and also to ship a portion of their product. George Appleman is president; Harvey Smith, vice-president and Fred Reed, secretary-treasurer.

PENNSYLVANIA

Business in the Connellsville coke region continues to increase gradually. At the Orient plant the Hillman Coal & Coke Co. is firing 180 ovens and the Oliver & Snyder Steel Co. is increasing coking operations.

The Buckeye Coal Co., Brownsville, Pa., a subsidiary of the Youngstown Sheet & Tube Co., expect to finish the installation of the skip hoist at the Nemacolin mine in Greene County, about Jan. 1, after which daily output will be increased from 3,000 tons, as at present, to 5,000 tons.

After being in operation for 81 years the Coleraine mine, near Hazleton, has been closed down permanently. In its 81 years of operation the mine has had three different owners.

"Work at the Face" meetings, which are a form of educational and entertainment gatherings of mine workers and superintendents, were conducted last week by the Olyphant and Eddy Creek collieries of the Hudson Coal Co. in Olyphant. L. F. Weichel, new superintendent of collieries, addressed the meetings.

The Haddock Mining Co., aside from striking valuable and extensive virgin coal deposits in the vicinity of Silver Brook, where it recently acquired new holdings, has struck some extensive veins of which nothing had been known in that section. It is thought that these are extensions of the different veins, the Mammoth included, from the Mahonoy Valley coal basin.

Boyd C. Osler, mining engineer for the Hazle Brook Coal Co., in Hazleton, has resigned to become chief engineer and general superintendent for the Shamokin Coal Co., a concern that was recently organized for the purpose of reopening the old Neilson mine, in the Shamokin field. At one time Mr. Osler was in the employ of the Susquehanna Coal Co.

A mine abandoned by the Lehigh Valley Coal Co. located in Pottsville more than 25 years ago is to be reopened at once by Scranton and Wilkes-Barre capitalists. At the time of the abandonment of the mine, known as York Farm colliery, Lehigh Valley officials predicted that it would be reopened. Some of the coal will be taken from under the Schuylkill County court house, where veins lie so close to the surface that coal is struck in digging cellars.

There has been so much idleness among miners in the Phillipsburg region of central Pennsylvania due to the operators being unable to compete with other fields that the children of miners have been obliged to remain out of school through lack of proper clothing and sufficient food. People of the town recently contributed to a fund to purchase clothing for the children.

Representatives of many anthracite companies recently were the guests in Hazleton of the Bucyrus Steam Shovel Co., of Bucyrus, Ohio, to inspect the first power shovel over the 80-ton limit used in the anthracite field and the operation of equipment by electricity, with standard gage locomotives and cars on standard gage tracks at the Cranberry Creek Coal Co. stripping operation. The 380-ton shovel used in the stripping operation is the largest in the anthracite region. Following the demonstrations the company was host at a dinner at the Altamont Hotel in the evening.

Sixty-nine of the 168 fatalities during September in the industries of Pennsylvania occurred in the coal mines. Thirty-eight of these deaths were in the anthracite and 31 in the bituminous mining districts. In industrial and manufacturing plants 65 fatalities happened during September while in the public utilities there were 34 deaths. The mine fatalities were divided as follows: Anthracite—Lackawanna, 8; Luzerne, 18; Northumberland, 4; Schuylkill, 8. Bituminous—Allegheny, 1; Armstrong, 1; Butler, 1; Cambria, 4; Clearfield, 1; Fayette, 7; Greene, 1; Indiana, 5; Somerset, 2; Washington, 3, and Westmoreland, 5.

Harrison D. Mason, Jr., formerly secretary and member of the firm with the Mine Safety Appliances Co., Pittsburgh, is now chief engineer with the Commercial Coal Mining Co. at Ebensburg. "Joe" Mason, as he is very generally known among his friends, is well known to the coal mining fraternity through his five years' service with the U. S. Bureau of Mines, as safety engineer attending some 38 mine explosions and fires, also through his service as secretary-treasurer for the Coal Mining Institute of America.

The present officers of District No. 2, United Mine Workers, which includes the central Pennsylvania bituminous field, will all have opposition at the election which will be held in December. District President John Brophy will be opposed by George Bassett, of South Fork, while Vice-President James Mark will be opposed by Jerre Ford, of Patton. John Ghizzoni, of Washaw, is having opposition in the person of Evan Thomas, of Barnsboro, for member of the International executive board. Richard Gilbert, the present secretary-treasurer, will have no opposition. Practically all the members of the district board and the organizers have opposition for re-election.

Three masked bandits, heavily armed and with a high powered automobile waiting to carry off the loot, held up a train crew and three guards early Saturday morning, Oct. 11, and carried off a safe containing $33,000 in cash belonging to the Ebensburg Coal Co., intended to pay miners at the coal company's operations at Colver, Cambria County. James Garman, aged 65, employed as a guard by the coal company, was shot when he grappled with the bandits.

The Koontz Coal Co., of Frostburg, Md., announces the purchase of the Pine Hill Mine, in Somerset County, formerly operated by C. J. Rowe & Co., which went into the hands of receivers. Pine Hill is one of the oldest workings in the Somerset field and for many years produced a large tonnage. The Koontz Coal Co. was recently organized by William and James Jenkins, of Frostburg, and Jonathan Jenkins, of Baltimore.

Officials of the Cranberry Creek Coal Co. in the Hazleton field of the anthracite region are having a permanent flume constructed to carry the flow of mine water past a mine opening. It is of large capacity and will afford protection there against conditions which arose several weeks ago when a rainstorm swept the anthracite section, causing heavy damage to various operations. Cypress is being used and the wood is grooved to provide for any expansion. The side supports for the flume are now in place and the bottom

Mabscott Team

This group scored a perfect record and won $60 and the company cup in the New River Co.'s fifth annual first-aid contest recently at Mt. Hope, W. Va.

boarding also installed. The job is being watched with unusual interest by coal company officials generally.

TEXAS

The Texas Gulf Sulphur Co., of New York City, is reported to have acquired 1,400 acres of lignite land in Milam County, Texas, and will develop same.

VIRGINIA

J. H. Franks, of Toms Creek, has resigned his post as assistant superintendent and general mine foreman of the Virginia Iron, Coal & Coke Co., to accept a better position with the Fordson Coal Co.

WYOMING

Production in the Rock Springs district is steadily improving. Most of the mines, with the exception of some of the smaller commercial producers, are working five days a week. On Oct. 2 the peak for the fall was reached, when approximately 15,000 tons was shipped.

Only two more bodies remained in the Sublet No. 5 mine of the Kemmerer Coal Company, on Oct. 8, four bodies having been recovered the day previous. These were found beneath bad cave-ins on the slopes. Thirty-nine men lost their lives in this mine on Sept. 16 in an explosion which badly wrecked the mine.

Eugene McAuliffe, president of the Union Pacific Coal Co., has offered the churches of Rock Springs full co-operation in obtaining church services for the outlying camps of the Rock Springs district. The ministers of that city are working out a schedule. It is thought that each denomination will name a Sunday night during the month when services will be held in a specified camp by its minister. Some churches also are preparing social service programs, chief of which is the Methodist, Rev. Roy E. Burt, pastor, who is planning week-day religious groups and boys' and girls' activity clubs for all camps.

Life checks are now in use in all of the mines of the Union Pacific Coal Co. at Rock Springs, Cumberland, Hanna, Winton, Superior and Reliance, it has been announced from the company headquarters at Rock Springs. Every person who enters a mine of this company, whether miner, official or visitor, receives a brass check bearing a number, and the name of the person together with the number is listed on the company books until the bearer has returned the check.

CANADA

The congratulations of many friends are being extended to Gordon B. Mackie, of the Penn Canadian Fuel Co., Toronto, on his recent marriage at Stroud, Ont., to Miss Lucy McWaters, of that place.

Following a series of conferences held by Roy M. Wobvin, president of the British Empire Steel Corporation, and the steel and coal managers, H. J. McCann, general manager of the Dominion Coal Co., stated that conditions at present do not warrant the expectation that more than two Cape Breton mines will be kept in operation during December and January. However, if efforts now being made to obtain a Canadian National Railways contract prove successful, the steel plant will re-open before the end of the year. Should this be the case there should be an average amount of employment at the mines in the early winter. The management of the coal company insists that it cannot find a market for its coal and is therefore compelled to suspend operations in the majority of its pits. Not having any funds in the exchequer it is stated that coal will not be banked during the coming winter.

Among the questions to be decided during the western visit of Charles Stewart, Dominion Minister of Mines, is the fate of the lignite briquet plant at Bienfait, Sask., in which the governments of Saskatchewan, Manitoba and Canada spent many thousands of dollars.

A new colliery is announced for the Nicola-Princeton district in the Tulameen Valley Coal Mines. This company is developing what is reported to be a promising field and is likely to be shipping this winter.

Wm. Roper has retired from the management of the East Wellington Coal Co. and has been succeeded by William Wilson, formerly overman at No. 1 Mine, Extension, B. C.

George S. Rice, of the U. S. Bureau of Mines, recently visited the Springhill collieries and the submarine mines in Cape Breton of the British Empire Steel Corporation. At the request of the company he made an inspection of the method of mining in the Allan shafts, with a view to offering some helpful suggestions for improvements.

William Sherman, president of District 18, United Mine Workers, announces that the striking miners of Alberta have ratified the new working agreement, submitted to them for a referendum vote.

On Sept. 30 the output of the collieries of the Dominion Coal Co., a subsidiary of the British Empire Steel Corporation, was 18,018 tons, the largest for a single day in nine years. The total output of coal for September was 273,374 tons, an increase over August of about 40,000 tons but slightly less than the output for September, 1923.

The plant and land at Port Stanley, Ont., of the Nukol Co., which has been in the hands of a receiver for some time, have been sold to two Toronto firms for $2,500. The company purchased the plant for $5,000 and in addition to installing much costly machinery, renovated it extensively. The value of the machinery alone, which is to be shipped to Toronto, is between $15,000 and $20,000.

Norman Harvey, formerly Deputy Minister of Railways for the Province of Alberta, is making a survey of the coal resources of western Canada with a view to making a report to the Vancouver Harbor Commissioner. The purpose of the latter is to ascertain the prospects of building up a greater coal bunker trade through the port of Vancouver. Mr. Harvey recently was in consultation with Howard Stutchbury, trade commissioner, and coal operators of Alberta. Mr. Harvey is classifying the coals of the two provinces and estimating the present and future requirements for marine bunkering at the Pacific coast. He also will report on the development of coastwise and trans-Pacific business both in marine and domestic coals.

An order made at Osgood Hall, in Toronto, last week directs the winding up of the Rocky Mountain Collieries on the petition of the Brazeau Colliers, Ltd., creditors to the extent of $289,849. The Rocky Mountain Collieries were incorporated in 1909 with a capital of $1,000,000, to take over certain coal locations owned by the German Development Co. Sir William Mackenzie, it is stated, promoted the incorporation, being desirous of obtaining a half interest in the properties. The provisional directors, G. A. Ruel, A. J. Reid and A. J. Mitchell, disclaim any interest in the company and referred the petitioner to Mackenzie, Mann & Co., whom they represented.

New Companies

Northwest Coal & Iron Co., Ltd., has been incorporated to produce and deal in ores, metals and minerals, with head office at Toronto and a capital of $1,000,000, by Julia J. Butterfield, Alan G. McDougall, Frederick H. Honeywell and others.

The Ute Coal Co. has been incorporated in Axial, Colo., by L. H. Pattison, R. W. Kilmer and S. G. Lehr.

The Bear River Collieries Co. has been incorporated in Denver, Colo., with a capital of $1,000,000, by J. L. Jones, G. E. Fraker and W. Glauster.

The Beach Fork Blue Gem Coal Co. has been incorporated in Tazewell, Tenn., by G. M. Montgomery, John T. Rogers and M. R. Carr.

Among recently filed charters in Kentucky were the following: **Elliott & Day Coal Co.**, Pikeville, capital $10,000. W. K. Elliott, P. W. Day and T. L. Day. **Gregory Branch Coal Co.**, Grays, $50,000, J. T. Gray, Matyie Gray and H. E. Hubbard. **Dozier-Dimond Coal Corporation**, Madisonville, $20,000; W. B. Dozier, Jesse Dimond and E. W. Dozier.

The Citizens Coal Co., with a capital of $22,000, has been formed by Isaac Jones, Thomas C. Walton, John C. Howell and others at Higbee, Mo., to own and operate a coal mine.

The Canon United Coal Co. has been incorporated in Canon City, Colo., with a capital stock of $20,000 and 10,000 shares of no par value, by W. E. Prall, M. Lewis and C. Linkins.

The Jericho Coal Co. has been incorporated in Owensboro, Ky., with a capital stock of $50,000, by W. Minter, 1751 Linden Street, Memphis, Tenn., B. D. Williams, Jr., and Dolph Woodruff both of Mannington, Ky.

The W. D. Lacy Coal Co. has been incorporated, with a capital stock of $10,000, in Waco, Tex., by W. D. Lacy, F. L. Miller, 1211 Washington avenue, and others.

The American Steel & Wire Co., a subsidiary of the United States Steel Corporation, has acquired the plants and other assets of the Cyclone Fence Co. The latter company is capitalized at $1,500,000 and has plants at Cleveland, Waukegan, Fort Worth and Newark.

The Piedmont Coal Co., of Dora, Ala., has been incorporated with a capital stock of $18,000, all paid in. The incorporators are Mrs. C. S. Ramsay, of Birmingham, and W. W. and J. H. Bankhead, of Jasper, Ala. They will conduct a general coal-mining business.

Traffic

Approves Cancellation of Rates By Lehigh Valley

The Public Service Commission of New York has approved cancellation by the Lehigh Valley R.R. of commodity rates on coal (anthracite screenings and pea and buckwheat screened from prepared sizes), carloads, from Tifft Farm (Buffalo) to Buffalo, Caledonia, Cheektowaga, East Buffalo, Niagara Falls and Suspension Bridge, effective Nov. 2, 1924, leaving no rates in effect for such service. Sup. No. 1 to P. S. C. No. A-289.

The commission has also approved the cancellation by the Lehigh Valley R.R. of tariff providing handling charges on anthracite coal screenings (including pea and buckwheat) made in dumping coal into vessels at Tifft Farm (Buffalo) and North Fair Haven, viz.: picking up and loading into cars for reshipment over trestle or for rail movement; effective Nov. 2, 1924, leaving no rates in effect for such service. Sup. No. 1 to P. S. C. No. A-300.

Hearing Announced on Change In Ohio Switching Rate

The Coal, Coke and Iron Ore Committee, Central Freight Association Territory, will hold a hearing in Room 606 Chamber of Commerce Building, Pittsburgh, Pa., Thursday, Oct. 30, 1924, at 10 a.m., Eastern standard time, on a contemplated change in the switching rates on coal, coal boulets and briquets, coke (except petroleum coke), coke breeze, coke dust and coke screenings, carloads, as shown in B. & O., C. & C. Series, I.C.C. 2,429, from the point of connection of the Baltimore & Ohio R.R. with the Pennsylvania R.R. at Martins Ferry, Ohio, to private sidings on the B. & O. within the switching limits of Martins Ferry, Ohio. It is proposed to cancel the switching rate of 13c. per net ton, minimum $3.60 per car, and apply a rate of 76c. per net ton, as per Agent Davis' Tariff I.C.C. 43, and B. & O. Tariff I.C.C. 2,306.

Hearing Set on Application for Through Rates from Colorado

Examiner Keeler of the Interstate Commerce Commission will hold a hearing at Topeka, Kan., Nov. 7, on the application of the Kansas Public Utilities Commission for a through rate on coal moving from Colorado to points on the Frisco and Katy.

"At present, points on these lines are paying a combination of local and through rates," A. M. Corp, rate expert for the Utilities Commission, explained. "A through rate to these cities would result in a considerable decrease. We desire to put into effect joint through rates and divisions on coal from Colorado in place of the present schedule, which is a combination of locals over the junction points."

The Santa Fe, Union Pacific, Missouri Pacific, and the Rock Island are the defendants in this action. All these lines bring coal from Colorado. The Frisco and Katy do not run into Colorado.

Protest by Burns Bros. Against Hard-Coal Rates Dismissed

Freight rates on anthracite, in carloads, from the Shamokin district of Pennsylvania to Elmira, N. Y., are not unreasonable, the Interstate Commerce Commission has ruled. It also finds no irregularity in the failure of the Lehigh Valley to absorb switching charges at Elmira. Therefore the commission has dismissed the complaint of Burns Bros., of New York, contending that charges for the detention of interstate shipments of coal, in cars constructively placed short of destination, are unreasonable.

Enjoins Raise in Switching Rate

The Colorado State Public Utilities Commission on Oct. 10 forbade the Colorado & Southern R.R. to make any increase in the freight switching charges in Denver for a period of 120 days. The railroad recently filed a notice that it intended making an increase of 33⅓ per cent. The Victor-American Fuel Co. protested.

Association Activities

After a useful existence of eight years, the **Southern Ohio Coal Exchange**, which had headquarters in Columbus, passed out of existence last week. The association was composed of operators in the southern Ohio field, including the Hocking Valley proper and Pomeroy. W. D. McKinney was its secretary and active head while James H. Pritchard was mining commissioner. The association sprang into existance in 1916, when it was believed that a closer association of producers in the southern Ohio field was necessary and Mr. McKinney was called to be its first secretary. He waged many successful fights for the rights of the operators of that field, including several successful freight rate controversies before the Interstate Commission and the Ohio Utilities Commission. Lack of funds caused by bad business in the field is the cause for the demise. Steps may be taken later on to revive the organization or to get operators in that field together for mutual benefit.

Obituary

William P. Porter, aged 57, a retired coal operator of Vinton County, Ohio, died suddenly while at a gasoline filling station from heart trouble. He resided in Columbus for the past seven years and was prominent in Masonic circles. He leaves two sisters and a brother.

Coming Meetings

Illinois Mining Institute. Annual meeting, Nov. 22, Elks Building, Springfield, Ill. Secretary, Martin Bolt, Springfield, Ill.

American Society of Mechanical Engineers. Annual meeting, Dec. 1-4, Engineering Societies Building, 29 West 39th St., New York City. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

West Virginia Coal Mining Institute. Annual meeting, Dec. 2-3, Welch, W. Va. Secretary, R. E. Sherwood, Charleston, W. Va.

Coal Mining Institute of America. Annual meeting, Dec. 3-5, Chamber of Commerce Bldg., Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Box 604, Ebensburg, Pa.

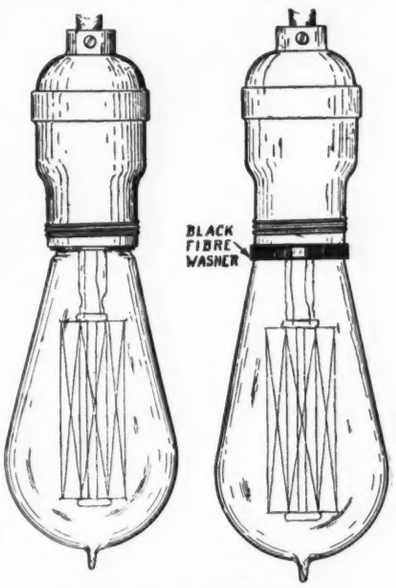
West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers. Fourth annual convention, Dec. 12 and 13, Huntington, W. Va. Secretary-Treasurer, Herbert Smith, Huntington, W. Va.

New Equipment

Lock for Electric-Light Bulbs

A simple and effective lock to prevent the theft of electric light bulbs recently was placed on the market by the Ren Manufacturing Co., Lyseum Building, Winchester, Mass.

This device, called the Ren-Lock, consists of a coiled spring and a grooved ring. A special device is used to attach the lock to the socket.



Unlocked and Locked Lamp

The small size of the locking device permits its use on any brass socket regardless of the type of reflector used with the lamp. This feature is important if the light center is to be maintained.

When a lamp is locked in place by means of this devise it cannot be removed except by breaking the glass. A special bag is provided for catching the broken pieces.

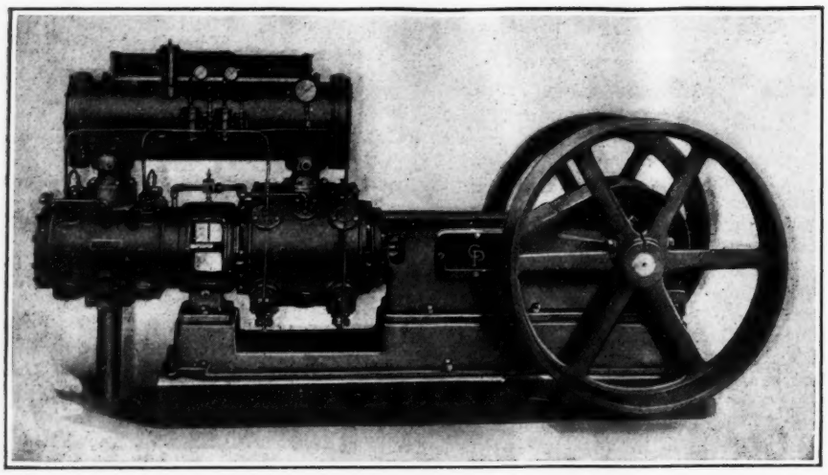
Spring and Washer

These are the only two parts of the locking device. The coiled spring has a projecting end which locks the lamp.

Straight Line Two-Stage Air Compressor

The low power consumption per cubic foot of air delivered and the favorable physical conditions of the air resulting from two-stage compression have long been recognized by compressed-air users, but the initial cost of the compressor and the expense of installation have heretofore overbalanced these favorable features, with the result that only machines of large capacity have been available—the majority of which have been of the duplex construction.

Such construction, while entirely logi-



Two-Stage Compressor Arranged for Belt or Motor Drive

This tandem unit is arranged so that all the stuffing boxes are easily accessible. The intercooler is rigidly mounted above the two cylinders and may be reached from either end. Automatic start and stop control apparatus, together with automatic unloading features, makes it easy to start or stop the compressor from remote points.

cal for machines of over 500 cu.ft. piston displacement, has proved too expensive to manufacture for smaller capacities, besides being too costly to install because of the complicated foundation required and the nicety called for in aligning the machine. Furthermore, the average compressed-air user has in the past neglected to look carefully into the power costs involved in operating single-stage air compressors of smaller capacities. Now, however, the economies required by present highly competitive business conditions make it necessary that every operating cost be reduced to the minimum, particularly power costs.

In order to meet the conditions outlined above, the Chicago pneumatic straight-line two-stage belt- or motor-driven air compressor has been developed. Operating at 275 r.p.m., this compressor has a piston displacement of 360 cu.ft. of free air per minute; air pressures range up to 125 lb. It is adapted to be driven by a belt or by a synchronous motor with rotor mounted directly on the compressor crankshaft.

Tandem construction is used in this unit, in which the low-pressure cylinder is placed next to the frame and the high-pressure cylinder is connected to the low-pressure cylinder by means of a tandem piece through which the piston-rod stuffing boxes are easily accessible. The intercooler is rigidly mounted above the two cylinders, in which location it is convenient for cleaning, which may be done from either end.

The whole unit is mounted upon a substantial subbase which gives the rigidity so desirable in a machine of this class. Perfect alignment of the machine is assured, resulting in maintained high mechanical efficiency and consequently prolonged life. This feature also gives the unit a degree of portability not realized in duplex construction and for this reason it will appeal to those compressed-air users who frequently employ semi-permanent installations.

On first thought it might appear that the bearing pressures in such tandem construction are unusually high, but such is not the case, as the maximum pressures are even lower than those found in single-stage machines of equal size.

The whole unit is remarkable for its accessibility and ease of adjustment. The bearings are readily gotten at and adjusted with a minimum of exertion; especially is this true of the wedge adjusted connecting-rod bearings, which are so easily and conveniently adjusted that the operator is encouraged to keep them in perfect condition, thereby eliminating the most frequent cause of compressor failures.

Simplate air valves are used throughout, assuring high efficiency and trouble-proof operation of the most vital part of the compressor.

Automatic operation is attained in a high degree. Splash and flood system of lubrication is employed for all bearings and the cylinders may be lubricated by the standard sight-feed lubricator, by a pneumatically operated force-feed lubricator, or by a mechanically driven force-feed lubricator.

Regulation of the volume of air and its pressure is entirely automatic and can be made to conform to the special conditions of the demand for air. Three-step capacity regulation is furnished in which two differential unloaders operating automatic unloading simplate inlet valves cause the compressor to operate at full, half and no load, according to the air demand, with maximum efficiency and evenly distributed crankshaft torque. Such operation results in splendid load characteristics for the driving motor since the steps are clearly defined in loading and unloading, obviating any surges in the power line that would otherwise result.

When the air demand is fairly constant for periods in the day, with intervening periods in which there is slight or no demand for air, and the compressor is driven by an electric motor, automatic start and stop control operation can be employed, in which case the unit is equipped with a centrifugal unloader which causes the automatic unloading inlet valves to be held open during the period in which the compressor is at a standstill and to remain open until, in starting again, the compressor has nearly reached normal speed, when the valves are again allowed to operate.

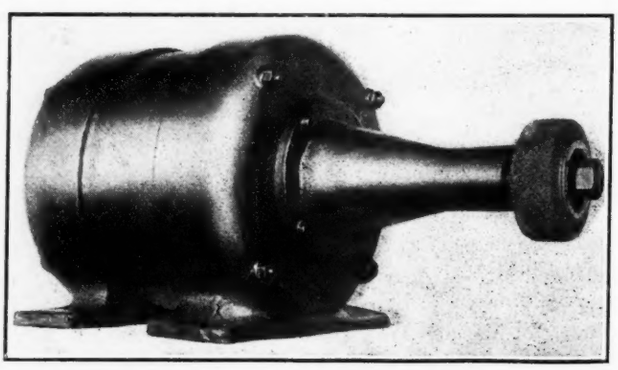
During slowing down prior to stopping, the unloader comes into action, throwing the load off the compressor, thereby eliminating much objectionable slapping of the belt in the case of a belt-driven unit. Complete automatic operation of the unit with utmost economy is effected through the use of a water-control valve which automatically stops the flow of cooling water through the jackets and intercooler during periods in which the compressor is at a standstill and allows it to flow when the compressor is in operation.

High-Speed Motor Operates This Grinding Wheel

Forbes & Meyer, 192 Union St., Worcester, Mass., has developed a new grinder. The motor is of the induction type, giving speeds of 5,400 or 7,200 on 60-cycle three-phase current. Such speeds have generally been considered impossible with the induction type of motor, but have been accomplished by using two primary windings, each receiving current directly from the line, while both act on a common secondary member. The motor is fully inclosed.

The grinding wheel is mounted directly on the motor shaft. It is supported by three ball bearings, one close to the wheel, and one at each side of the motor. This makes the machine run smoother than it would if it were attempted to support as long a shaft as this on two bearings. The wheel is spaced 7 in. from the motor so as to avoid interference.

The 5,400 speed of the motor is correct for 4-in. to 4½-in. diameter wheels, and 7,200 is the speed for wheels of about 3 in. in diameter, though smaller wheels can be used efficiently.

Grinder and Motor on Same Shaft

Three ball bearings permit the grinder to operate efficiently. A specially designed high-speed motor drives the small wheel at 7,200 r.p.m.